THE IRON AGE

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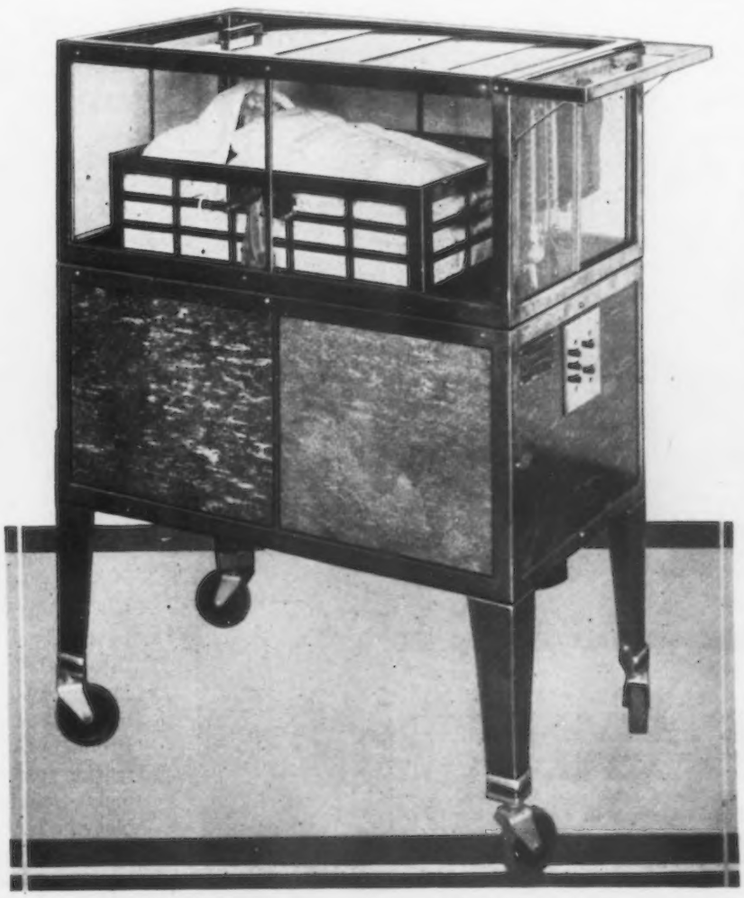
Chrome-Nickel Alloy Finds Varied Uses In Unusual Products

BY GEORGE S. HERRICK*

WHEN a metal-working shop is engaged on contract work, large and small, an interesting, and at times unusual, array of products is entered on the order books. Especially is this so if the shop is prepared to fabricate from high chrome-nickel alloy steel equipment formerly made of other materials. With the corrosion-resisting alloy coming into wider use, many companies are experimenting with its possibilities for their own product, or in the equipment they use for production.

Baby incubators are not among the articles to which high production methods need be applied, so that among the unusual orders recently executed by the Pressed & Welded Steel Products Co., Eleventh Street, Long Island City, New York, there appears an incubator of Allegheny metal, the chrome-nickel alloy steel produced by the Allegheny Steel Co., Brackenridge, Pa. Made for use in a New York City hospital, it consists of a glass case with movable panels mounted on a steel frame and set on rubber-tired wheels, as appears in the accompanying illustration.

The upper section, occupied by the bassinet bearing the prematurely born child, consists of two glass panels on each of the four sides, set in frames pressed from No. 24 gage sheets. The top is covered with a series of solid sliding panels, cut from No. 18 gage sheets. Movable panels on the top and sides permit the gradual opening of the incubator, in which the temperature and humidity are controlled, until the child is living in the ordinary room atmosphere.



BABY Incubator of Chrome-Nickel Alloy Steel. Concealed by the panels of the lower section is a humidifier, all welded, of chrome-nickel alloy steel

*THE IRON AGE, New York.

The lower section, with bakelite panels, is equipped with a humidifying pan 6 in. x 20 in. and 5⅜ in. deep, formed of No. 24 gage Allegheny metal sheets. Over the pan fits a cover 1½ in. deep and with three 2-in. holes in the top, into which are crimped collars of the same gage sheets for tubing to carry the humidity into the upper section. Inside the pan is a trough with two divisions, built up of No. 24 gage sheets. The entire humidifier is welded throughout.

The bassinet, which was formerly of woven wire, white enameled to prevent corrosion, is of high chrome-nickel alloy bars for the frame with strips of the alloy woven into a basket. A light gage sheet was tried for this weaving, but it was found necessary to use No. 16 gage strip for the finished product. Each strip is spot welded to the frame and at the intersections of the strips. The frame, as appears in the illustration, is formed of chrome-nickel alloy angles and all joints are welded, which is a departure from the original incubator, constructed of 1-in. square bars of ordinary steel at the four corners, forming into a unit the upper and lower sections and legs.

Ice Units for Shipping Fish

Preserving fish on a long inland journey requires plenty of refrigeration. Recently the Atlantic Coast Fisheries Co., New York, ordered a number of ice containers for this purpose, made in the form of a large, centerless doughnut with the ice inside, the outside diameter 15 in., inside diameter 8 in. and height 4 in. No. 18 gage, unpolished alloy sheets were used and as the quantity ordered was not large enough to justify a special die for stamping 15-in. circles with an 8-in. hole in the center, the top and bottom were cut with rotary shears, except for a 2-in. hole for filling with acid, midway between the center hole and outer edge, which was stamped.

When filled with acid of low freezing temperature and frozen, the units are placed in the bottom and on the top of balsam wood containers of frozen fish. The design used, instead of a plain metal drum, provides a considerably greater radiation surface, so that fish are preserved for 24 to 48 hr. during shipment.

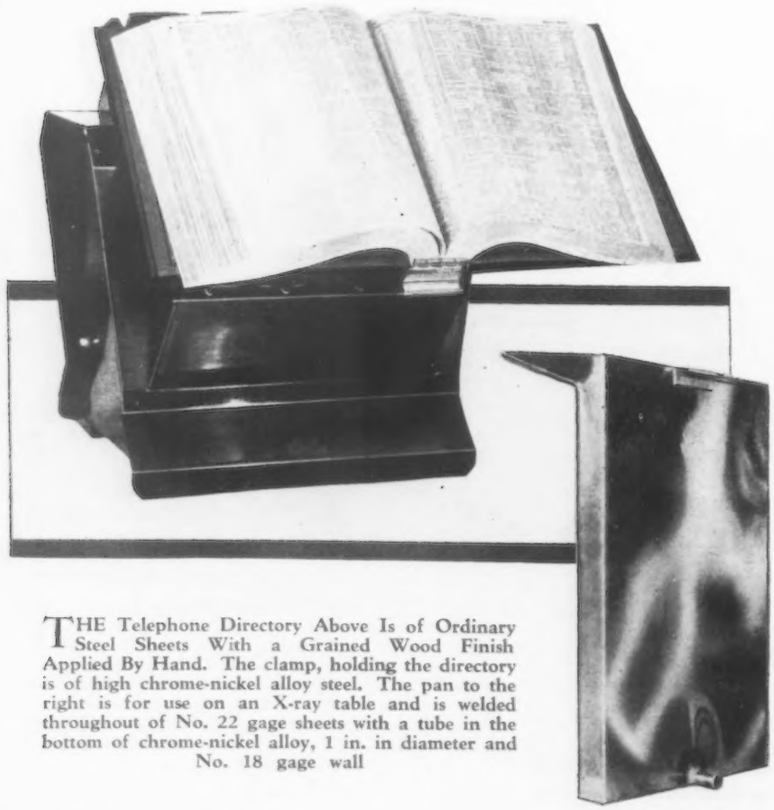
Large Capacity Film Developers

The motion picture industry and its requirements for large scale developing of film is providing another substantial outlet for this alloy with its resistance to acid. Purchases of film developing tanks of high chrome-nickel alloy by the Duplex Motion Picture Industries, Inc., Long Island City, have included 83 of 540-gal. capacity and 40 of 225-gal. capacity. Formerly glass or vulcanized rubber tanks were used, as metal quickly corroded from the developing chemicals. Both capacities, the 2 x 3 x 12-ft. and the 1½ x 2 x 10-ft. tanks, were of all-welded construction, fabricated from No. 16 gage sheets in the walls and a ½-in. plate in the bottom. The bottom plate was tapped with four 1-in. holes to admit tubes of high chrome-nickel alloy, through which the developer is pumped into and out of the tank. The heavy bottom is necessary, as the tanks when installed are mounted on a pedestal, so that the bottom supports the entire weight of the tank and its contents.

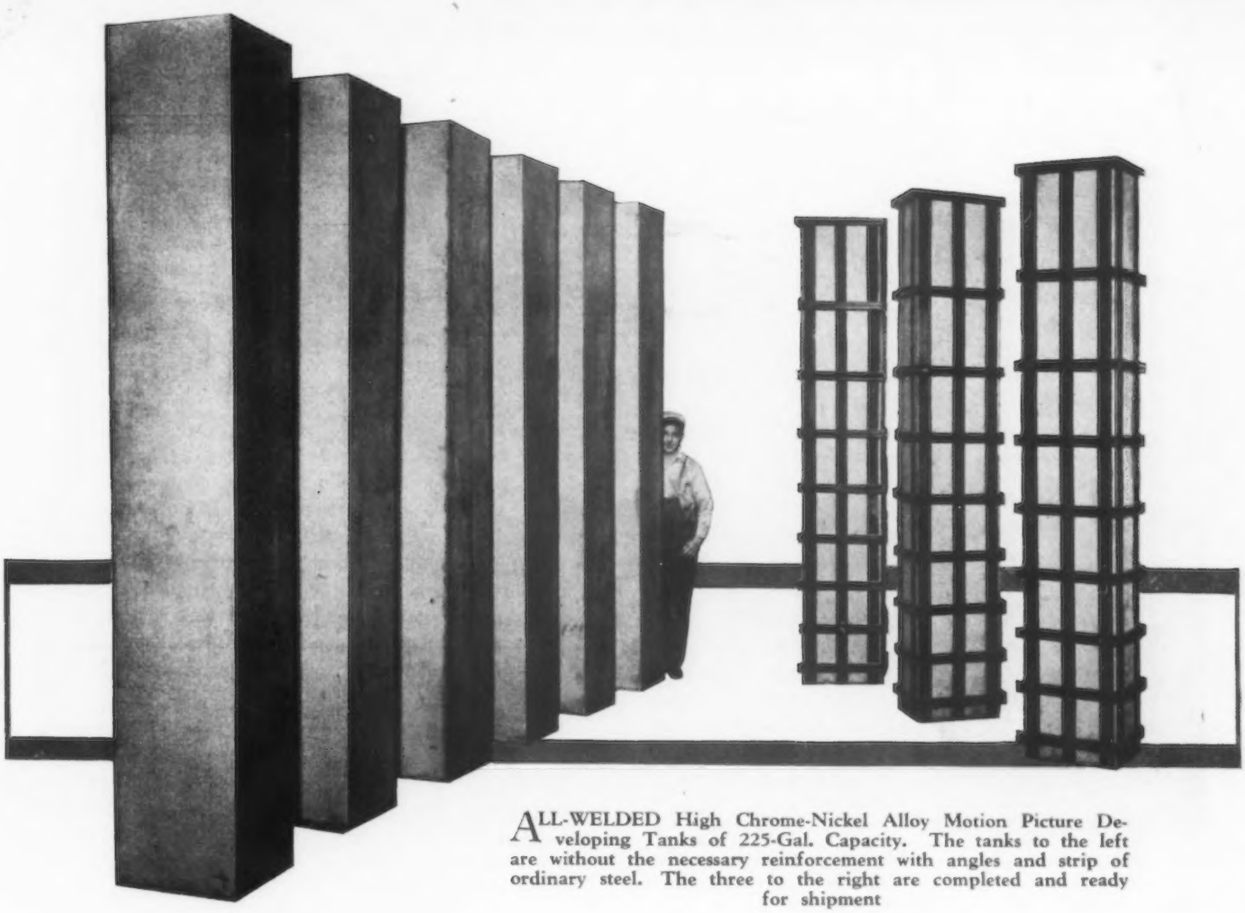
The sides were electrically welded and the ½-in. plate in the bottom was beveled on the edges and butt welded to the sides. For reinforcement, ordinary mild steel angles were used, coated with asphalt paint as protection against the acid which might spatter over the top. This provided adequate reinforcement at a much lower cost per tank than the use of high chrome-nickel alloy throughout.

Extending between the legs of the angles on two sides of the tank are through-rods, which can be tightened by means of nuts on the ends. For longitudinal reinforcement, 3 x 3/16-in. ordinary strip steel was used, as appears in the illustration of the completed tanks. The strips were all welded to the reinforcing angles at points of intersection.

Developing tanks of high chrome-nickel alloy steel are being extensively used, evidenced by the fact that in addition to those fabricated for the Duplex Motion Picture Industries, Inc., by the Pressed & Welded Steel Products Co., for use by the Fox motion picture interests, other metal-working plants have furnished a large number fabricated of heavier gage sheets to Warner Brothers Pictures, Inc., and



THE Telephone Directory Above Is of Ordinary Steel Sheets With a Grained Wood Finish Applied By Hand. The clamp, holding the directory is of high chrome-nickel alloy steel. The pan to the right is for use on an X-ray table and is welded throughout of No. 22 gage sheets with a tube in the bottom of chrome-nickel alloy, 1 in. in diameter and No. 18 gage wall



ALL-WELDED High Chrome-Nickel Alloy Motion Picture Developing Tanks of 225-Gal. Capacity. The tanks to the left are without the necessary reinforcement with angles and strip of ordinary steel. The three to the right are completed and ready for shipment

other film companies for use on the Pacific Coast.

Covers Made for Mayonnaise Mixers

An alloy resistant to 80 per cent of all acids is obviously unaffected by a food product, such as mayonnaise. Richard Hellman, Inc., Long Island City, N. Y., manufacturer of mayonnaise, recently ordered a number of bowl covers for its mixers, and although the covers have now been in use for about nine months they remain unaffected, while the average life of the non-ferrous metal covers formerly used was 2½ to 3 months.

The covers are fabricated of high chrome-nickel alloy sheets in two sizes. The smaller are flat topped, 21½ in. in diameter, made from a circle sheared from a No. 18 gage sheet and with a ½ x ½ x 1/16-in. angle, rolled to a diameter of 19½ in. and spot welded inside the edge. The hopper or cone-type covers are 26½ in. in diameter and require a draw of 7½ in. on a No. 18 gage polished sheet. The large covers come down over the edge of the mixing bowl, which is of cast iron, tin coated, 24 in. deep. Because of the small number of bowls required in contrast to the covers, and the considerable expense of making a draw of 24 in. in chrome nickel alloy, it has been substituted only in the cover of the mixers.

Pan for X-Ray Table

High chrome-nickel alloy is finding a field of special usefulness in hospitals. The pan in the accompanying illustration is for use on an X-ray table and is a duplicate in the steel alloy of a brass pan, nickel plated, which was formerly used. It is formed of No. 22 gage sheets, acetylene welded throughout, after which it was ground smooth and polished on the outside.

There are many other instances of substitution of this corrosion-resisting alloy steel in articles formerly made from other materials. Makers of blue prints have used it as a substitute in their baths for marble, soapstone, vitreous enameled ware, and specially coated zinc or wood. In the past year about 100 tanks for zinc plate etchings have been pressed and welded of Allegheny metal for use by newspapers in various cities. Reflectors for the new sun lamps have been drawn and a copper smelting company has adopted chrome-nickel alloy pails for handling sulphuric acid, entirely arc welded of No. 18 gage sheets with the ears of the pail spot welded and the bale a chromium-nickel alloy bar.

Tenth International Congress of Acetylene, Autogenous Welding and Allied Industries will be held in Zurich, Switzerland, July 9 to 12, for which cooperation of welding associations from America and 13 European countries has been assured. Meetings for discussion will be held in the Federal Polytechnic School, and various industrial establishments in the neighborhood inspected. Headquarters are at the office of the Swiss Acetylene Association, 12 Ochsengasse, Basle, Switzerland, which will reply to inquiries from prospective participants.

Japan Needs Foreign Machinery

Industrial Expansion Requires High Production Equipment for Textile, Flour, Oil, Paper Mills and Other Industries

BY WALTER BUCHLER

The Golden Pavilion at Kyoto

ALTHOUGH there is a sizable production of iron and steel in Japan, developed through a tariff and Government subsidies, demand is growing rapidly, and in better grade materials that country should continue to be largely dependent on imported products.

Japanese steel producers are active in urging the Government to impose higher duties to aid domestic industry. Although there are only a few steel companies, they have tremendous influence in Japanese politics, being powerful enough to defeat the party in power. Another important consideration in recent years has been the desire of the Government to make Japan as independent as possible of the raw materials required by the iron and steel industry as a measure of national defense.

The increasing demand for iron and steel products has resulted from the progressiveness of the Japanese, who have shown much enterprise in general construction work. The number of fine, modern buildings of the best materials is growing yearly, especially in Tokio, Kobe, Yokohama, Osaka, Kyoto, and Nagoya.

Modern office buildings and other business structures which have been erected in Japan in recent years, especially since the earthquake of 1923, are of steel construction, many five to eight stories high, replacing the usual two or three story Japanese buildings, which are often used as combination offices and dwellings. Rapid industrial development has necessitated construction of more and larger warehouses, which are now made of reinforced concrete.

While a majority of Japanese houses are still constructed almost entirely of wood, little, if any, metal being used, there is a very decided trend toward Western modes of living. In the cities higher buildings are appearing and in the residential districts dwellings are being built in Western style.

The Government is seeking in rapid industralization of Japan a solution to its population problem. The country now has 65,000,000 people and the yearly increase is about 1,000,000. Many industries are still in the "cottage" stage of development, and it is aimed to substitute modern factories for the home shops, where many hundreds of thousands of Japanese still work at low wages and production is slow and by no means uniform.

To an increasing extent the Japanese manufacturer is seeking mass production, for which he needs the best and most reliable machinery, and is prepared to pay for it, with quality as the principal consideration.

Textile Mills Use Foreign Machines

The textile industry offers a large field for the sale of such machinery. The competition this Japanese industry has been offering to the world's leading textile manufacturing centers is in part attributable to the progressive policy of its leaders in installing the most modern equipment in their mills. Textile machinery is being built in Japan, but it is not considered as reliable as imported equipment. Consequently, Japanese purchases of foreign textile machinery have been steadily increasing, and in 1929 consisted of 12,486,612 yen ($7,156,386.33) worth of spinning machines,

THE author, who speaks and writes Japanese, is familiar with industrial Japan through personal contact, having been engaged in Far Eastern trade and manufacturing for the past ten years. In THE IRON AGE of April 10, page 1073, he discussed the "Future Steel Needs of China."

637,061 yen ($314,-708.13) worth of weaving looms, 411,283 yen ($203,173.80) of tissue finishing machines, 222,222 yen ($109,-777.67) of knitting machines and $9,222,-086 yen ($4,555,710.-48) of sewing machines and parts.

Sunset on the Inland Sea

Railroads Buy Less

The Japanese Government, which owns and controls most of the railroads in Japan and Chosen, is no longer inclined to pursue a policy of expansion of its lines, apparently preferring to use automobile transport to feed existing rail facilities. It is, however, improving the present railroad system, substituting new locomotives and cars for obsolete equipment and speeding the service by replacements of heavier rails and locomotives.

Except for locomotives and tenders, imports of railroad material and equipment have declined in recent years. While locomotive and tender purchases advanced from 905,264 yen ($447,200.42) in 1928 to 1,062,555 yen ($524,902) in 1929, rail imports which were 6,855,743 yen ($524,902) in 1927, declined to 3,768,180 yen ($1,861,481) in 1928, and were only 2,807,510 yen ($1,386,910) in 1929.

Commercial Aviation Fostered

In aviation the Government has pursued a progressive policy, increasing its equipment with modern aircraft and training many military and naval pilots. There are ten important aircraft and accessory factories in Japan, chiefly engaged on Government orders. Much material and complete aircraft are still purchased from abroad, however, because of superior quality. Demand for imported aircraft and material is likely to grow, for the Government, some time ago, announced its intention of spending $11-000,000 in the next seven years in financial assistance to commercial aviation.

A Market for Ship Materials

A half-century ago Japan's merchant shipping consisted largely of junks, plying only to Far Eastern ports. In the past ten years the number of shipyards has steadily increased, now totaling 362. So far, however, shipyards and engineering works in Japan have not made products of as high quality as the imported, lacking the skill and experience. Their growth has been rapid and quality has been of less importance than quick production. Japan relies on foreign supplies for shipbuilding materials and, despite Government aid, it is still more expensive to build a steamer in Japan than abroad. As a result, Japan continues to buy the better type of ship from foreign shipyards, so that there is a good market in Japan not only for ships, but for all construction materials. Replacement of sailing vessels with steam and oil driven ships in the coastwise trade offers a further outlet for such supplies. In 1929 Japan's imports of complete steamships declined considerably, but imports of dynamos, motors and ship machinery increased slightly.

Attending to the Mail in a Japanese Home

Extensive use of electricity in Japan provides an export market for medium and high-grade electrical products and equipment, particularly for precision and high-speed machinery. These qualities Japan has never been able to attain, and has always bought more satisfactory material from abroad. The principal electrical products for which there is a good market for American manufacturers and exporters are insulated wire, meters, batteries, telephone and telegraph instruments, including radio receiving sets, transformers and electrical carbon.

Japan's paper industry is well organized, and all types of paper are manufactured. Foreign machinery is used in most of the paper and pulp mills, the domestic equipment, as a rule, not comparing in quality with the foreign. Japan ships considerable quantities of paper to China, and is increasing exports to other Far Eastern markets. Considerable expansion may be thus expected in Japanese requirements for paper mill machinery.

The flour mills in Japan are also mostly equipped with foreign machinery. The oil-milling industry, however, is not so completely modernized. There are about 40 oil mills with modern machinery, but hundreds are using hand-power mills and generally operating by primitive methods. Consequently there is a potential market for high-grade hydraulic presses for crushing soya beans, peas, cotton, and other oil seeds which Japan imports from Manchuria and Shantung.

Street Railroads Expanding

Electric street cars are widely used in Japan. Tokio, Osaka, Kobe and Nagoya are well supplied with street cars, particularly the first two, where nearly every main road has an electric car line, and most of the other large cities have at least one electric car system. While other countries are adopting rail-less electric cars

or motorbuses, when extensions are necessary, or are abandoning street cars entirely for bus transportation, Japan is increasing the mileage of electric railroads in cities and suburbs.

A Band from a Department Store in Shizuoka Announcing a Special Sale

There is an excellent market in Japan for many products, but a great deal depends upon proper marketing. When selling iron and steel on a large scale, it is customary for the buyer to pay cash at the mill or factory, or f. o. b. port of shipment. Some exporters and manufacturers (especially in Germany) occasionally ship merchandise on consignment. This is not advisable unless the seller has a branch in Japan. The market there is so large and assured that opening a branch office deserves serious consideration. Even when dealing directly with large Japanese importers, it is often of advantage to have an agent there, as it is the writer's experience that Japanese are more inclined to give business to foreign representatives than to brokers or their people.

Foreign representatives should have some knowledge of spoken Japanese. This is not so difficult to acquire nor does it take so long as is generally believed. A speaking knowledge of Japanese is a great asset, and not only promotes business, but places transactions on a safer basis, as the foreigner able to understand Japanese can follow negotiations better, instead of relying entirely on an interpreter.

Advertising is popular, and displays, catalogs and newspaper space should be used until a name has been well established.

It is most important that patents and trademarks should be registered at the Japanese Patent Bureau in Tokio, as there is an inclination to copy foreign products, although the domestic imitation is inferior to the original. However, despite these difficulties Japan is one of the best markets in the Orient for iron and steel products, and American manufacturers and exporters, in these days of keen competition, can not afford to neglect it.

Correlation of Blast Furnace Output with Diameter

ARISING from the discussion of the paper by Evans and Bailey (*Journal*, Iron and Steel Institute, 1928, No. 1, page 53), an inquiry was addressed to all German blast furnace works, with the object of eliciting opinions as to whether the quantity of carbon burned in front of the tuyeres is in constant relation with the output of pig iron, that is, whether the combustion capacity of a furnace is a correct measure of its output capacity. The relation between output and hearth diameter was also particularly inquired into. The replies, as studied by G. Eichenberg in *Archiv für das Eisenhuettenwesen*, July, 1929, have thrown some light on the question of the correlation of output with hearth dimensions.

Replies were received relating to 173 blast furnaces and in all cases there appeared to be a direct connection between diameter and output. But this relation can by no means be regarded as constant. Diagrams were plotted showing the amount of carbon consumed per 24 hr. in front of the tuyeres in relation to hearth diameter, and this appears always to reach a maximum with a hearth of 5.5 m. (about 18 ft.) diameter. In relation to diameters above that size the carbon used in 24 hr. tends to fall.

It is safe to regard the quantity of carbon consumed in a given time as being in constant relation to output, but the output cannot safely be correlated to hearth diameter or to hearth area.

Great Bulk of Manganese Goes into Steel

ABOUT 95 per cent of the manganese consumed in the United States is used in the manufacture of steel. Formerly manganese steels containing 1 to 1.5 per cent manganese were classed as good-grade Bessemer steel, but recently they have been classified as alloy steels and have been put on the market under various trade names. Such steels have excellent tensile strength and ductility, with high resistance to abrasion, and are used extensively in caterpillar shoes, truck wheels and other appliances where relatively low cost and high quality are required.

Manganese is also an important constituent of nickel and molybdenum steels. Molybdenum steels usually contain 0.2 to 0.4 per cent molybdenum and 1 to 1.5 per cent manganese. Nickel-manganese steel usually contains approximately 1 per cent nickel, 1 to 1.5 per cent manganese and 0.3 to 0.4 per cent carbon. The nickel adds ductility and toughness, but increases the cost.

Although information on the rates of reduction of iron oxides is rather limited, less is known about rates of reduction of manganese oxides. The North Central station of the United States Bureau of Mines, in cooperation with the University of Minnesota, Minneapolis, is undertaking an investigation of the equilibria among carbon, oxygen and manganese, preparatory to a later study of rates of reduction of manganese oxides, a more difficult problem. Rates of reduction of manganese oxides and silicates will apply to present methods for production of ferromanganese and will also be useful in developing pyrometallurgical methods for utilizing domestic deposits of low-grade manganese material.

Training Future Business Leaders

Engineering Graduates Are Prepared for Positions of Responsibility in Westinghouse Organization in Special Course

By CARL S. COLER

DURING the present month some 10,000 young men will be graduated from the engineering departments of 148 colleges and universities in the United States. Half of this number will be electrical and mechanical engineers, of whom about 3400 will hold the electrical degree and 1600 the mechanical. A few years ago these young men would have had considerable difficulty in finding positions in the country's large industrial organizations. Now their services are actively sought by foresighted companies, which are anxious to insure their futures by means of leadership that has been properly trained.

Most of the youths about to get their degrees are already employed. In fact, graduates of leading technical schools undoubtedly have some difficulty at present in choosing the business association which they wish to make, as the inducements offered are by no means small. Nor is the financial consideration always uppermost. Large corporations have found that the supervised practical training which they are able to offer the engineering and business neophyte is most often the deciding factor in the competition for future executive and engineering personnel.

To meet this competition the Westinghouse Electric & Mfg. Co., East Pittsburgh, has worked out a comprehensive program, known as the graduate student course, for which some 400 men are chosen each year from about 100 engineering schools, to be given a year's training preparatory to their assumption of positions of growing responsibility in the company.

Colleges Offer Best Material

The student training course in the Westinghouse company has proved its worth in some 30 years of successful administration. It was inaugurated because an increasing number of young men with potential ability were developing these resources at college. Ordinary, routine jobs no longer appealed to men with higher education for, as industry became more specialized, they experienced difficulty in gaining the broad background required for leadership. Many became dissatisfied before the normal process of promotion advanced them, or adjusted themselves to their surroundings to become specialists—good men for the work they were doing, but not particularly qualified for higher responsibility.

The problem in a large organization of having young men ready for positions of greater responsibility in the future thus resolves itself (first) into attracting young men with potential ability into the organization (second), so training these men that they can compre-

INDUSTRY has devoted much attention to training apprentices, foremen and others responsible for physical production. With few exceptions the training of executives has been left to its own devices. The Westinghouse company has been one exception and our author has spent the greater part of his business career in developing training methods for executive and engineering personnel. A native of Hackensack, N. J., Mr. Coler was employed in the manufacture and testing of electric meters with the Westinghouse company in 1906-07. He later attended Cornell University, from which he was graduated in 1911. He spent two years in the Westinghouse graduate student course and then was engaged in manufacturing production work, as secretary of the grievance committee and as secretary of the occupation and rates committee. In 1917 he was made director of trades training and, in 1919, manager of the educational department. Mr. Coler is prominently identified with the American Management Associaton, Pittsburgh Personnel Association, American Institute of Electrical Engineers, Society for Promotion of Engineering Education and the National Association of Vocational Education.

TRAINING RECORD

CLASSIFICATION CENTRAL STATION SALES

NAME IN FULL

HOME ADDRESS 10 G Street, South Boston, Mass.

DATE OF BIRTH October 25, 1904 HEIGHT 6'2" WEIGHT 198 lb

SERIOUS PHYSICAL DEFECTS None

MARRIED OR SINGLE Single NATIONALITY American

FATHER'S BUSINESS Retired - Owned Paper Stock Business

SCHOOLS	Courses Taken	How Long	Year Grad	Degree
HIGH SCHOOL Boston Latin	Classical	4	1923	
COLLEGE Mass. Inst. of Tech.	E.E.	4	1927	B.S.
TECHNICAL SCHOOL				

SCHOLARSHIP, QUARTER OF CLASS Second ACCEPTED Roberts SEGREGATED HVB - TAMcD - FGK

SCHOLASTIC HONORS, FRATERNITIES, ETC.

YEAR	PART TAKEN IN ATHLETICS, CLASS ORGANIZATIONS, STUDENT SOCIETIES, ETC.	OFFICES HELD
FRESH.	Freshman Crew	
SOPH.	Varsity Crew - Tech Boat Club	
JUNIOR	Varsity Crew - Tech Boat Club	Vice Pres. of Boat Club
SENIOR	Varsity Crew - Tech Boat Club	Executive Committee

OUTSIDE INTERESTS

PRACTICAL EXPERIENCE

INCLUDING REMUNERATIVE WORK DURING VACATION AND COLLEGE, IN ORDER OF DATE, NAMING MOST RECENT FIRST

KIND OF WORK	WITH WHOM	WHERE	HOW LONG
Steam Fitting	Beacon Oil Co.	Everett, Mass.	12 mo.
Engineering Office	Beacon Oil Co.	Everett, Mass.	3 mo.

PER CENT COLLEGE EXPENSES EARNED 40%

EDUCATIONAL DEPARTMENT RECORD

COURSE STARTED 3-1-27 COURSE ENDED 4-1-28 DISPOSITION

SHOP WORK	MONTHS	APPARATUS CONFERENCES	ATTENDED
Switchboard	1	Switchgear Apparatus	5
Industrial Motors	1	Insulation	3
Power Winding	1	Power	2
Power Assembly	1		
Power House	1/2		
Power Test	1 1/2	Regular Test Reports	2
Transformers	1	Transformers (Sharon)	4
Meters, Instruments	1	Written Report (Newark)	
Street Lighting	1/2	Written Report (S.Bend)	
Insulators	1/2	Written Report (Derry)	
Induction Regulators	1/2		
Insulation	1/2		
Large Turbines)			
Small Turbines)	2	South Philadelphia	12
Condensers)			
Commercial School	1/2	Lectures and Classes	Daily

GRADES	
SHOP	91.66
CLASS	92.05
COM. SCHOOL	90.8
PERSONALITY	A
FINAL	92.91
GROUP	A
REMARKS:	

COMMENTS

EACH Student's Training Record Is Maintained to Show the Personal Characteristics and Performance of Each Student Enrolled for Training. On this blank are recorded the opinions of the supervisors and executives who have had charge of the activities of the student during his training period. It is used in connection with the final assignment of the individual to his regular work in the organization, and in determining his rate of compensation. The upper part of the record is practically the same as on the interview record.

hend and evaluate broadly the many phases of a complicated situation; and (third) keeping them in the organization until they are needed for a position of greater responsibility. The solution of the above problem is obviously a plan for the development of leaders within the company, and the training program naturally becomes a responsibility of good management.

Selection by Personal Interview

The competition encountered in the selection of engineering school graduates for further training in the Westinghouse graduate student course may best be indicated by the fact that an increasing number of industrial organizations is employing more and more electrical and mechanical graduates each year, from a supply which is remaining about constant. Many concerns have inaugurated training programs very recently and new industries annually require the services of additional men.

All are anxious to secure men who stand in the first half of their class scholastically, and many place a high rating on extra-curricular activities of a sort likely to develop leadership and self-reliance. Practical experience gained in summer employment is also held at a premium, and varying stress is placed upon physical qualities, intelligence, leadership, personality and special talents.

In the first four months of the calendar year representatives of the Westinghouse company make personal visits to the various schools and colleges from which men are to be chosen. Blanks provided for filling out by interested students require full information regarding college activities, practical experience, outside interests and, most important of all, the kind of engineering work in which the applicant is most interested. On the other side of the blank the applicant is rated by a responsible faculty representative and also by the interviewer representing the company.

Filling out of the student interview blank carries no obligation on the part of the student. It is merely filed for future reference, in case the graduate decides to make formal application for enrollment in the student training course. Potential applicants are urged

to consider all the details of the plan carefully before signing the formal application blank, as that carries with it an agreement to report for work if the application is approved within a reasonable length of time.

Terms of Employment

SUCCESSFUL candidates for the Westinghouse student training course are required to report for work at East Pittsburgh at convenient intervals during the six months immediately following graduation. Efforts are made to receive a few men every two weeks, so that all may be given individual attention and that the organization may not be burdened with a large number of untried applicants at the same time. This plan also makes the training course continuous and assures an uninterrupted supply of talent for the various personnel requirements of the company.

During the training period, students may be assigned to shop, laboratory or office work. Wages are based on an hourly rate for a 48-hr. week. The average hourly rate for the first six months of the training course is now 63c., having been advanced this year from 50c., while in the second half year it now stands at 70c., as compared with 55c. last year.

Membership in the Westinghouse relief department provides sickness and accident benefits at a nominal rate. After six months of service, the company takes out an insurance policy in favor of the employee, at no cost to him. Student membership in the Westinghouse Club is also available at a nominal charge, entitling graduate students to participate in all club affairs. This club not only fosters social and athletic activities among the students, but also provides optional educational courses along any line in which a sufficient interest exists to justify organized activity.

First Job Usually in Shop

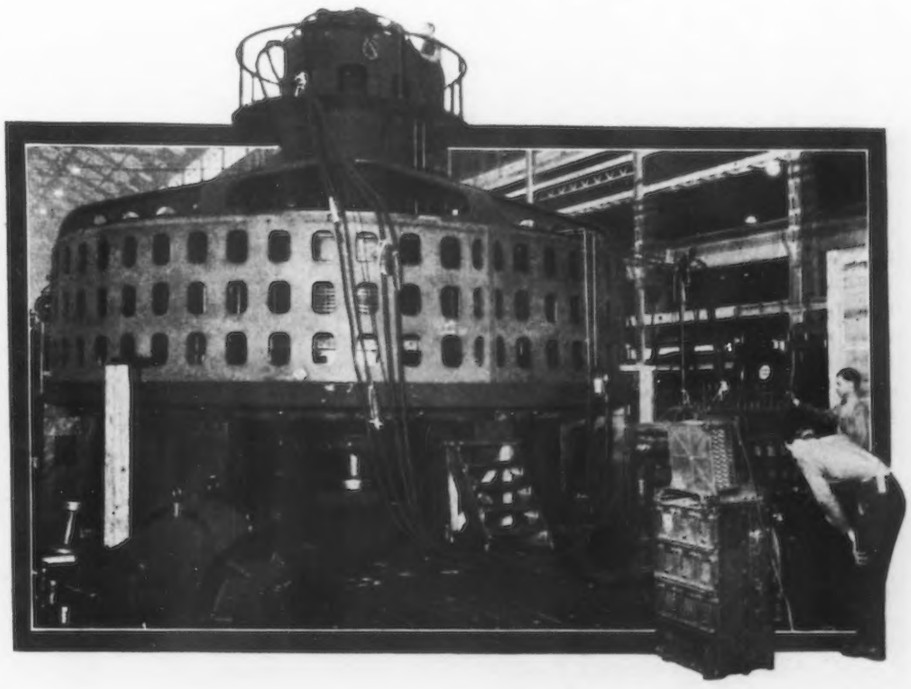
The first job of the student is usually in one of the shops. Here he becomes acquainted with general shop practice and also becomes familiar with tools and equipment, raw materials and finished machines. He finds out the high degree of perfection required by the company in its product, and likewise learns to respect the skill of the workman. Here also the student is taught a new sense of economy, a new respect for accuracy and a new appreciation for discipline.

Assignments to the various works and shop sections may vary considerably from the order on which they appear in the schedules, but a typical student schedule might include the following: one month on switchboard apparatus; one month on transformers; one and one-half months on large turbines, small turbines and condensers; one month on industrial motors; one and one-half months on motor tests; one month on circuit breakers; one-half month each on insulating materials, arc welding, renewal parts, and gears, pinions and trolleys; one month on industrial control; one month on control tests; two weeks on industrial heating, and two weeks in commercial school.

The length of a course may in some instances be extended from two weeks to a month, to coincide with the starting date of one of the commercial schools, four of which are usually conducted each year. Standard literature, descriptive of the various lines of products, is supplied to students for their information while working on the apparatus in the shops, and a questionnaire pertaining to the apparatus is furnished with the literature.

Weekly Conferences Held With Executives

Two hours each week are spent in conferences with engineers and executives. Here questions which have previously been assigned on the different apparatus are discussed, and the details of the job are rounded out into an understanding of the more general aspects of the work as a whole. Meanwhile information about the various fundamental divisions of the company's work is supplied, and interviews are arranged which



PRACTICAL Experience in Building and Testing Machinery Is Considered a Most Important Part of the Westinghouse Training Program. These students are performing tests on a large machine on the floor at East Pittsburgh works

look toward a definite crystallization of interest.

In six weeks or two months a definite program of work is arranged for the remainder of the year, which will lead toward the general objectives agreed upon. Engineering, design, commercial, works management and accounting groups are selected for advanced assigned work in these respective fields. Optional evening courses, either conducted by the company or by educational institutions in the Pittsburgh district, are available.

More than 500 students are enrolled yearly in the technical courses offered by the company, and advanced students in the Westinghouse Club put in 26,000 man-hours during the past year. Arrangements have been made with the school of engineering of the University of Pittsburgh, whereby students may secure credit on a master's degree while attending courses conducted by the Westinghouse company, as well as at the university. Some 300 employees of the company are now availing themselves of this opportunity.

Broad Foundation Established

AFTER 12 months of this work, young men are prepared to take up responsible work of a more specific character. In general, they have selected for themselves the field of the greatest interest and the kind of work in which they can best express their technical ability. They have also become familiar with the company's products, personnel and policies. Later, as they develop in this work as regular employees in the organization, those with particular aptitude are selected for executive positions, while others become leaders in the various technical fields.

Those who have completed the graduate student course have established a sufficiently broad foundation to give them perspective in their future development in the industry. They are prepared to coordinate their efforts understandingly with others. They have bridged the gulf between the classroom and the shop and are ready for advancement on the basis of merit. Such advancement itself offers many difficult problems.

How May Potential Leaders Be Held?

Much of the work of selecting and developing leaders may be of little value to the organization if the men selected and trained are not available when needed. Freedom of choice in employment is an American policy, and many companies do not adequately anticipate their own needs. Probably the first principle in holding good men in an organization is the ability on the part of the management to evaluate the ability of its employees. Of next importance are good records of personal characteristics and of performance, and then recognition in one form or another, including adequate compensation. Potential leaders are volatile. If they decide that the future does not offer opportunities where they are, they will go elsewhere, leaving the less desirable members of the organization to carry on its work, often unsuccessfully.

Some losses, of course, are to be expected. Because of this it is wise to provide a liberal margin of safety —to be reasonably generous in supplying men to other organizations, and at the same time to protect the future interests of the company itself.

Lack of competent leaders costs an industrial organization much money and the cost of their training is money well spent. In these days of specialized activity, a large proportion of this cost may be recovered in the form of productive work during training. The remainder, which may amount to a considerable sum in specific instances, represents a legitimate charge against the cost of the product, to insure adequate and continuous service to customers, steady employment to workers and sustained corporate earning power.

The Westinghouse company figures its investment per man for the first year at about $2,000, of which the cost to the company has been about 50 per cent. The remainder is paid for in the form of productive work during the training period. For those students who are being trained in highly specialized fields the cost may run considerably higher, and productive work during training must be greatly reduced. It is usually found, however, that if the investment is not made in this way the company is forced to pay for it elsewhere.

Engineering Schools Doing Good Job

In its student training course the Westinghouse company has done much to dispel the prejudice against college men frequently existent in large industrial corporations. It believes in the graduates of technical schools. Most of its principal executives, including its vice-presidents, departmental managers, district sales managers, works managers and engineers entered Westinghouse service directly from engineering schools.

Engineering schools are performing a service of ever increasing value to industry. They are doing this in the face of obstacles, political, financial and social, which would prove insurmountable to many organizations. Only through cooperation and mutual understanding between industry and engineering schools will future needs for men qualified to handle the growing responsibilities of industry be met.

In Support of Business Analysis and Statistics

FORECASTING the future direction of general business activity and buying power is a new science, say *Silberling Reports*. As such its results cannot be expected to be perfect; but its justification lies in the fact that, if it is performed in a truly scientific spirit and fortified by the technique of *measurement*, it can be of tremendous value in displacing the crude and unsatisfactory processes of random hunch and guesswork. The history of business conclusively proves that, as methods and tools are improved, their adoption by the progressive and enterprising irresistibly forces gradual abandonment of old-fashioned and inadequate devices through sheer competitive pressure.

Advances along engineering lines, and in the even more difficult arts of management and organization, soon become instruments whereby the leaders in business are able further to increase their lead over the laggards. There is already abundant evidence that the tools now provided by economic statistics and the applied science of forecasting forthcoming developments are being so used, and that as a result the entire business system has been strengthened to the point of being capable of withstanding shocks which 25 years ago would have been generally ruinous.

Progress in Brass and Bronze

What Deep-Etch Tests Reveal—Secondary Metal Ingots—Live Discussions on Melting and Other Problems at Foundry Convention

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SEVERAL sessions of the Cleveland convention of the American Foundrymen's Association, May 12 to 16, were given over to non-ferrous matters. At one session three papers were read, of which brief abstracts are given below. These covered "Deep-Etch Test of Brass," by W. F. Graham and L. A. Meisse, technical division, Ohio Brass Co., Mansfield, Ohio; "Application of Ingot Metal to Production of Brass and Bronze," by William Romanoff and C. O. Thieme, technical superintendent and metallurgist respectively, H. Kramer & Co., Chicago; "Overcoming Alloy Ingot Troubles in the Brass Foundry," by William E. Paulson, president, Thomas Paulson & Son, Brooklyn.

Deep-Etch Test of Brass

WHILE investigation of ferrous metals by so-called deep etching has been applied extensively in recent years, very little has been published on this method of investigating non-ferrous metals. This paper describes some typical results along these latter lines.

A smooth surface of metal is given a rather violent treatment by reagents which eat away the points or areas of discontinuity of the structure. Application in the authors' laboratory was confined largely to cast red brasses, and the proper reagent to use is nitric acid.

The deep etch is said to reveal not only inclusions and character of metal from oxidized or reduced standpoint, but also porosity, laminations or actual fissures which are not visible to the eye in the unattacked fracture. The information gained provides a means for the foundryman to survey conditions causing defects and to make the necessary corrections in his melting and molding practice.

Development of the use of ingot metal from secondary metals has been an economic necessity. Improper foundry practice has been the main cause of most of the troubles arising from the use of both virgin and secondary metals.

The ingot metal is made by refining sorted secondary metals, which removes the impurities, after which the metal is built up to specification and poured into ingots. The same physical properties may be obtained from properly refined ingot metal as from virgin metal, while considerable saving can be secured through the use of the ingot metal.

"Burnt" metal is really a misnomer, for brass is not burnt the same as steel. Some of the constituents may be oxidized or volatilized, due to wrong furnace atmospheres or excessive pouring temperatures.

An example is shown where standard ingot metal was remelted ten times without change in the physical properties. Trouble can occur in a foundry, regardless of what metal is being used.

Overcoming Alloy Ingot Troubles in the Brass Foundry

USE of alloy ingot was resorted to, to meet increasing price competition. A most carefully selected ingot gave castings which presented machin-

WILLIAM ROMANOFF

C. O. THIEME

W. F. GRAHAM

AUTHORS of Papers at the Session on Brass. Mr. Graham has been identified for some years with the non-ferrous industry and is a member of several of the committees of the American Society for Testing Materials

ing troubles. Specifications excluding all impurities known to be detrimental did not eliminate the difficulty.

Finally, ingot metal specially prepared from clean copper scrap and solder metal was secured and production troubles were overcome.

No turnings enter into the composition, nor is any red-metal alloy scrap permitted. The mixture is prepared from clean copper scrap and solder metal, with necessary additions of tin and lead. The whole bath of approximately 25,000 lb. is carefully refined in a reverberatory furnace.

Round-Table Discussion and Shop Operation Course

A HIGHLY profitable round-table luncheon discussion was held during "Foundry Week" and there were three shop operation courses, led by prominent men in the industry. Some of the chief points in these are here reviewed.

Non-Ferrous Round-Table Discussion

CAUSES and results of the formation of skull in crucibles and ladles were discussed at some length at a round-table luncheon of the non-ferrous group of the American Foundrymen's Association in the Hotel Hollenden, Cleveland, on May 15. Many speakers discussed the question of cleaning out ladles or crucibles, or the furnace itself, between uses. The point was brought out that, when particularly hard specifications were to be met, this cleaning must be done. As one man put it, however, "when we make run-of-mine castings, we do not clean the pots oftener than once a day."

Formation of skull came in for some attention and a description was given of one ladle in which insulation was placed between the steel shell and the refractory material. In this case a temperature drop of 20 deg. a min. was experienced, compared with drops of 35 to 40 deg. with a clay-lined ladle and 45 to 50 deg. with the crucible. With hotter metal, the skull may sometimes be melted out of the ladle by the next filling.

Cleaning of Furnaces and Ladles

An oil fire was reported to have a tendency to increase the building up of the slag or residue within a furnace. By using a blast in conjunction with a hot flame, this can be taken out. And, of course, a clean furnace means good brass. Sometimes this residue can be cleaned out of the furnace by fluxing it with fluorspar.

After mechanical cleaning of a crucible or a mud-lined ladle, sometimes the complete cleaning can be effected by inverting the ladle over a hot gas or oil flame. Any method of cleaning is likely to be somewhat expensive, but it is necessary for the best product. This is merely one step along the long road toward getting products of the highest grade.

One speaker reported that the building up of a deposit in a ladle will be retarded if the ladle is lined with a substance that will soften a bit under the high temperature. The deposit was reported to be one which is highly refractory and which, in consequence, is somewhat difficult to remove by ordinary methods. It has a relatively high melting point, being an oxide of the base metals. For this reason the effect of such a deposit in a ladle upon subsequent metal handled through that ladle is nothing like so great as might perhaps be expected.

It is impossible, said one speaker, to obtain secondary metals free from sulphur. Neither can we eliminate sulphur as we would like. This speaker believes that sulphur content of not over 0.06 or 0.67 per cent would have no appreciable effect upon the metal. With above 0.10 per cent sulphur, however, "we will be almost sure to get porous castings. With 0.15 per cent, the metal might as well be thrown away."

Effect of Sulphur in Castings

Sulphur is particularly bad in castings which are to be used under pressure. It was reported that the customary 80-10-10 mix will carry more sulphur without trouble than will the 85-5-5-5.

It was pointed out by one speaker that continual remelting of the metal, such as gates and sprues, results in adding sulphur to the product. For this reason ingot metal must necessarily be much freer from sulphur than the requirement for the final casting. Sulphur has a tendency to combine with almost any element present. One trouble that it creates is the formation of gas pockets. Also, it makes the metal very sluggish in action and may result in failure to fill a thin section of a mold. Offsetting this, in part, is the good point that sulphur tends to refine the grain of the metal.

Sulphur Hard to Remove

Attempts to remove sulphur from the ingot are usually futile. Tin, lead and zinc will be driven off from the metal before the sulphur is disposed of. With copper alone, however, the sulphur can be driven off without losing metal.

One point made by a speaker is the fact that when sulphur is added to give a particular quality to the casting, and is not in oxidized form, it is nowhere near so injurious an inclusion as residual sulphur. It is practically impossible to remove sulphur by oxidation, although it can be taken out of copper to a very small percentage—as low as 0.01.

Direct oxidation will not remove sulphur from either brass or bronze. The metal picks up from the fuel about half the sulphur content of the fuel. Perhaps half of this pick-up can be got rid of by oxidation, but the residual amount is extremely hard to remove.

Barrett Brass Melting Cupola

It is often desirable to melt non-ferrous metals in a cupola-type furnace in direct contact with the fuel, when this can be done without taking up bad elements from the fuel. A fixed-carbon fuel has been developed for this purpose and excellent results are reported from the volume melting in alternate layers of metal and fuel. This fuel is very hard and makes little dust.

It analyzes about 99 per cent fixed carbon, somewhat under ½ per cent sulphur and the rest ash.

This type of fuel has been used in a small cupola of about 36 in. diameter, lined down to 22 in. internal diameter, and taking a floor space about 44 in. square. In such large-volume melting a fuel ratio of about 15 to 1 has been experienced, and even on some occasions as high as 18 or 19 to 1.

Good Recovery of Metal

Metal recovery in this type of operation has been found to run from 97 to 97.5 per cent when charging ingot metal. Light scrap will give 96.5 to 97 per cent and borings and turnings 96 to 97 per cent. It is found possible to charge more scrap metal with this type of furnace and hence to get along with a smaller amount of ingot metal. The cupola is gradually refilled as the metal passes down through the 26 to 42 in. of incandescent fuel.

Metal losses on such a furnace, using a charge of 15 per cent chips and 85 per cent heavier scrap, principally returns in the form of gates and risers, was reported by one speaker as slightly under 2 per cent. Under similar conditions there was a 2.8 per cent loss when the charge was 50 per cent chips and 50 per cent returns. In neither case was any ingot metal used. This speaker reported upon results of such a charge, in which castings weighing 13,571 lb. were made with a net fuel expenditure of 829 lb. of coke, or a ratio of 16.3 to 1.

¶ Deep etch on brass reveals inclusions and character of metal as well as porosity and fissures

* * *

¶ Improper brass foundry practice main cause of most troubles from use of both virgin and secondary metals

* * *

¶ Impossible to obtain secondary metals free from sulphur

* * *

¶ A 97 to 97.5 per cent metal recovery is possible when melting in a cupola with fixed carbon fuel

* * *

¶ Economic advantage claimed in obtaining quick heats, thus making for lower costs

Melting Red Brass in Electric Furnaces

ONE of the shop operation courses or discussions was devoted to the melting of red brass in indirect-arc type electric furnaces. The experience of one speaker showed a fuel cost of 300 kwhr. to the ton of metal, as an average for observations extending over a period of seven years. This was on the basis of a 5½-day week of 48 hr.

Four furnaces are in use in this plant, having capacities respectively of 350 lb. (two), 750 lb. and 2000 lb. nominal, the two larger furnaces being actually charged up to 1000 and 2200 lb. respectively. One man operates the two small furnaces, while one operator and a helper take care of the two large furnaces. Thus the labor force is made up of a total of three men.

Electrodes 4 in. in diameter are used for the large furnaces, and 3 in. for those of 350 lb. The total electrode consumption is about 4½ lb. for each ton of metal melted.

Maintenance of linings was reported as very simple. The 350-lb. furnaces are giving about 2500 heats before needing relining, or some 875,000 lb. for the lining. The 750-lb. furnaces are giving about 1000 heats of 1000 lb. each, or a total of 1,000,000 lb. The largest furnaces are giving 750 heats, or about 1,650,000 lb.

Metal loss, based on the weight of metal in the ladle and figured from an alloy containing 14 per cent zinc, is about 0.75 per cent, with 0.4 per cent loss on other heats. The overall loss, on the inventory basis, figures out from 1¼ to 1¾ per cent. The metal is handled in steel ladles lined with clay and having a capacity of 250 lb. each. Several ladles full of metal come from each furnace at each heat.

One speaker pointed out that it is essential to keep clear of oil, cotton insulation and other deleterious elements entering the charge. Anything of this character has a tendency to leave finely divided carbon particles on the metal. This is one thing which will pretty surely result in poor metal.

Analysis of Sources of Metal Loss

This speaker reported having made a two-year analysis of losses. He placed the melting loss at 0.5 per cent; loss in pouring into molds, 0.5 per cent; loss in sand blasting, 0.15 per cent; apparent loss due to extraneous material in the metal, 0.25 per cent; loss in the recovery plant 0.25 per cent. The total figured out at 1.65 per cent average for the first year, and 1.62 per cent for the second year. He explained that the losses in the recovery plant were those sustained in recovering metal from the grindings, skimmings and floor sweepings, designed to get back all metal inadvertently spilled.

Speed of Operation a Cost Factor

That there is an economic advantage in obtaining quick heats, and thus making low power costs, was brought out by one speaker. He believes that either the direct arc or the indirect-type electric arc furnace is better fitted for this purpose than is a fuel-fired furnace. To accomplish this result he reported having changed over a transformer which the furnace maker had designed for 125 kva. to 200 kva., with the result of helping out the entire program.

Another speaker questioned this point. He reported getting 13 or 14 heats a day with a 100-kw. transformer and only 16 heats from one of 150 kw. As the electric "demand" charge for the larger unit was $50 a month more than for the other, he thought that the result was a more expensive operating basis.

(*Concluded on page* 1795)

Wire Cable Compacted by Stretching It Beyond Working Load

USERS of steel rope know that when new it is able to absorb heavy impact loads that would break it after it had been in service some time. C. C. Sunderland, chief engineer of bridges, John A. Roebling's Sons Co., Trenton, N. J., writing in *Engineering News-Record*, May 1, page 714, says this is due to the fact that the wires in the strands and the strands themselves have been worked into close contact in service, reducing the springiness of the construction and resulting in an increased modulus of elasticity.

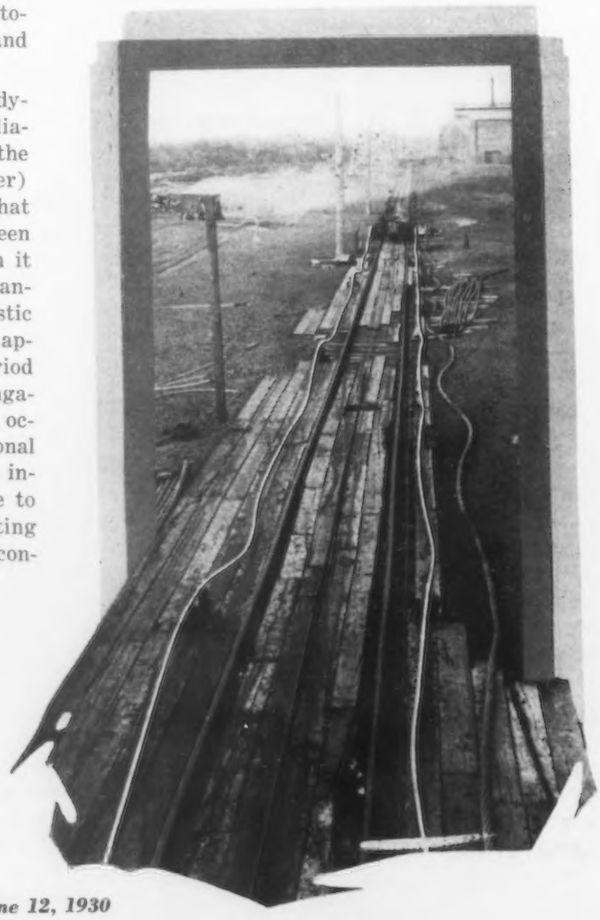
"When a rope is first subjected to working tension, its elongation consists of both an elastic and a structural stretch. The elastic stretch is that portion of the elongation that shows full elastic recovery upon release of tension. The structural stretch is the elongation which occurs over and above the true elastic stretch for any given tension, and does not show full recovery upon release of tension. The structural stretch is not a definite quantity, but is variable, depending on the size and power of the machine used to fabricate the rope, together with knowledge and skill of fabrication."

For example, in studying the stress-strain diagram of the rope for the Fort Lee (Hudson River) bridge, it was found that when any load between the tension under which it was stranded during manufacturing and the elastic limit of the rope was applied and held for a period of time, a continued elongation of the specimen occurred. "This additional elongation, without increase of load, was due to wires and strands seating themselves in closer contact, and was the structural stretch. Removal of this structural stretch was possible only by multiple stressing before erection.

"We consider the structural stretch removed when the rope shows well defined and uniform elastic stretch and recovery and when the load is maintained for some time at 80 per cent of prior stressing without showing any additional elongation of specimen."

For suspension bridge construction it is necessary that the elastic behavior of the main cables and the suspenders be accurately known and free from anomaly. Consequently this structural stretch must be removed before erection. It is necessary to fabricate such ropes with high tension and pressure, in order to approach more nearly the working tension of the rope in service. Proper manufacturing tension and pressure, together with accurately calculated wire sizes, will tend to assure uniformity of the elastic properties, but even these careful methods were not sufficient to produce rope to meet the exacting requirements for the foot bridge cables of the Fort Lee (Hudson River) bridge. Preliminary stretching is therefore done at Roebling, N. J., on a level track one-third mile long. Rope is anchored at one end to a 300-ton hydraulic Riehle testing machine and at the other end to a pair of 150-ton jacks (with long plungers to take up the progressive stretch).

STRAND to Be Stretched Is Strung Alongside an 1800-Ft. Track. The sheave car in the middle distance is drawing the cable from a reel placed behind the photographer's viewpoint

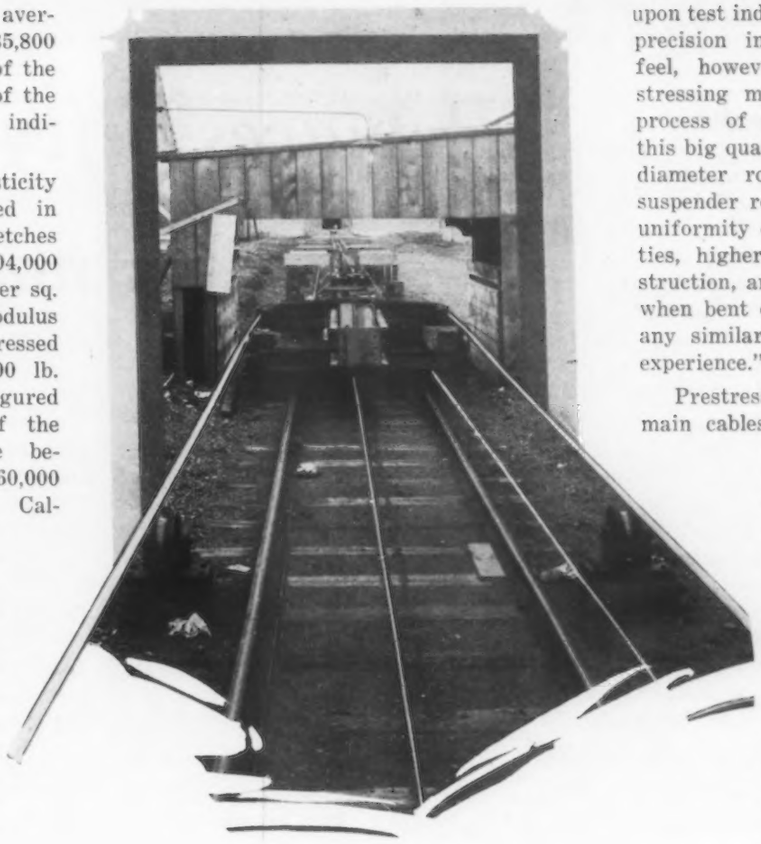


Procedure in brief is to mount a long piece of rope during the day and place the correct tension on it, keeping this tension constant during the night. In the early morning the tension is lowered to the specified amount and correct lengths measured with precision—the time being selected to avoid temperature corrections due to sunlight.

Twenty-seven tests were made on the prestressed suspender rope for the Hudson River bridge, and an equal number made on two parts of rope bent over a 21-in. sheave. This rope has a gross metallic area of 4.048 in. and in single line the ultimate strengths varied from 734,000 to 797,000 lb., the average being 780,000 lb. The lines bent around a

sheave broke at an average strength of 1,335,800 lb., or 85 per cent of the combined strength of the two parts, taken individually.

Modulus of elasticity of the ropes tested in one-third-mile stretches varied between 17,804,000 and 17,966,000 lb. per sq. in. The average modulus of 27 tests on pre-stressed rope was 18,001,400 lb. per sq. in. (as figured from the slope of the stress-strain curve between 80,000 and 160,000 lb. per sq. in.). Calculations for the bridge were made assuming a modulus of 18,000,000 and the foot-path ropes conformed to the computed deflection and have maintained their original position perfectly, thus indicating that prestressing has removed the structural set within the range of working loads.

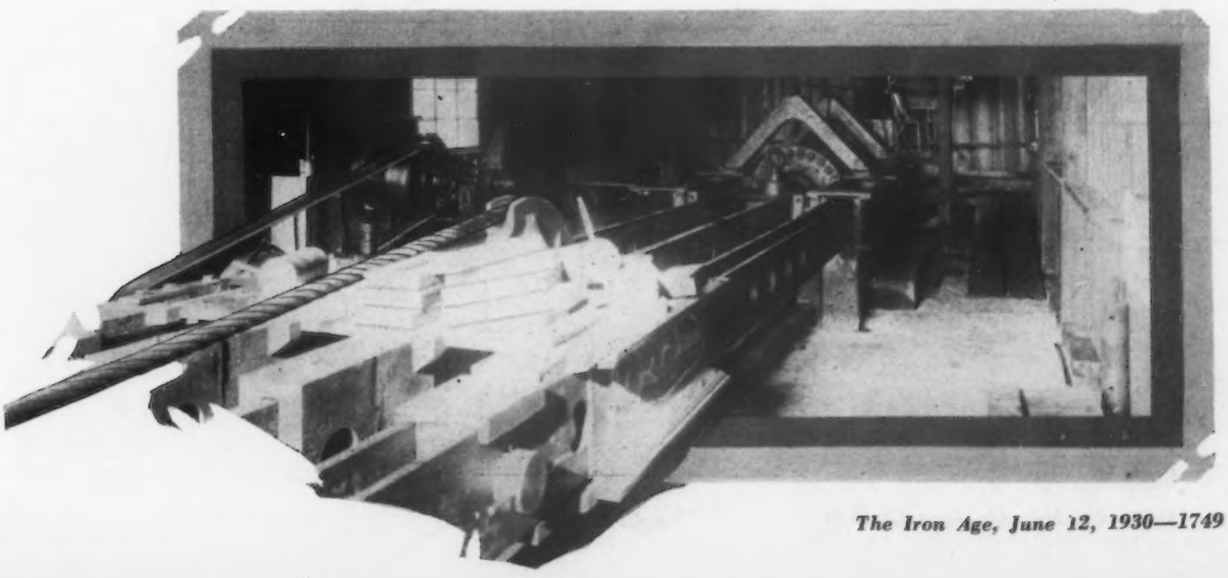


SHEAVE Car At End of Track Is Attached to a 600,000-Lb. Capacity Horizontal Testing Machine in the Distant Shed and Shown Close-Up Below. Stressing is done simultaneously to the two-part line, which of course is properly anchored at the other end

The galvanized ropes used for the Hudson River bridge are 2 15/16 in. diameter, of 6 x 37 construction, with an independent rope center, this center rope in turn being laid around a strand center. "The entire cross section is metallic," continues Mr. Sunderland. "Considering that this cross-section is composed of 283 wires varying in diameter from 0.065 to 0.195 in., it will be appreciated that the uniformity in physical properties secured upon test indicate both care and precision in fabrication. We feel, however, that the prestressing must constitute the process of major benefit, for this big quantity of the largest diameter rope ever used for suspender ropes shows greater uniformity of physical properties, higher efficiency of construction, and higher efficiency when bent over a sheave than any similar ropes within our experience."

Prestressed rope strands for main cables of moderate-span suspension bridges have some advantages. The St. Johns bridge in Portland, Ore., (illustrated in THE IRON AGE, April 17, page 1151), a structure with a 1207-ft. main span, used a number of 1½ in. diameter galvanized steel strands, each with gross metallic area of 1.34 sq. in..

Stress - strain curves and data are given in the article showing tests on a strand for the above-mentioned bridge. On first stressing, the linear relationship between load and stretch changes very gradually up to about 100,000 lb., but thereafter it changes rapidly. Upon release from a first load of 205,000 lb. the contraction was uniform from 200,000 lb. down. Second stressing gave an equally straight line for stress-strain relationship up to 180,000 lb.



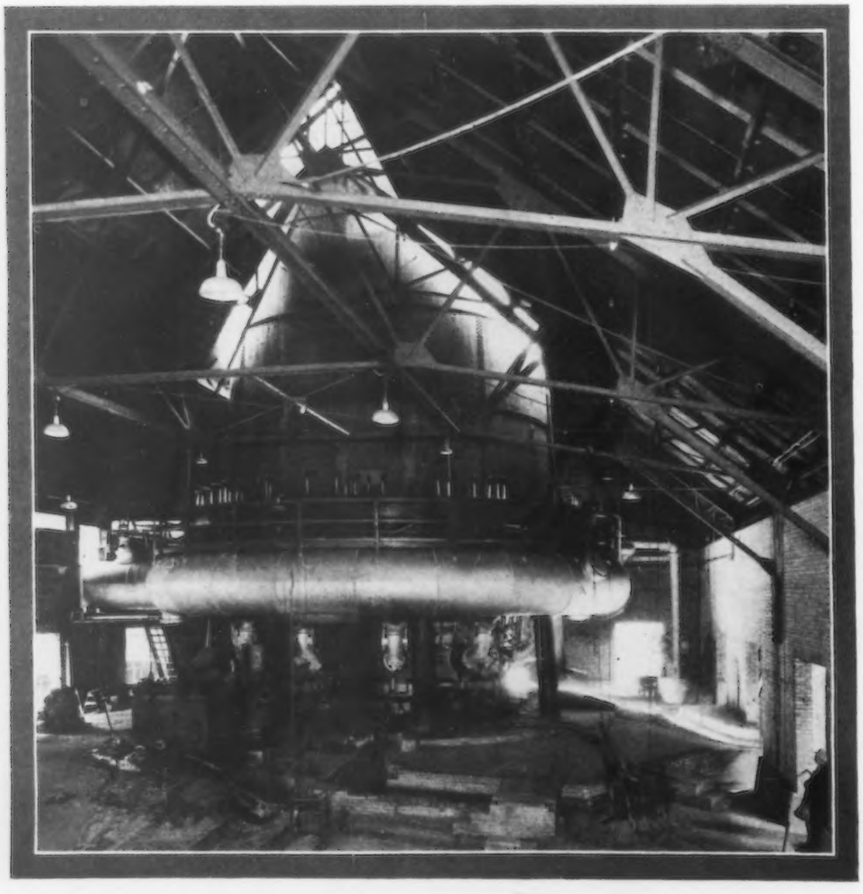
Replaces Fifty-Year Old Furnace

WISCONSIN Steel Co., South Chicago, Ill., has replaced a 50-year old hand-filled blast furnace of 250-ton capacity with a new stack of 600-ton rating. Principal dimensions of the new furnace are 18 ft. 6 in. diameter of hearth; 21 ft. 10 in. diameter of bosh; 16 ft. 6 in. stock line; 12 ft. 6 in. bell and height 90 ft. from top ring to tap hole. This unit is served by three 22-ft. x 115-ft. insulated stoves, two of which have an insert type of checker work. Iron is run to 55-ton track ladles and cinder ladles are of 330 cu. ft. capacity each.

Old Stack Was Built in 1880

Invitations were sent out in 1875 for the opening of the Calumet River to navigation and commerce on July 5 of that year, and the laying of the corner stone of the Joseph H. Brown Iron & Steel Co. works at South Chicago, Ill. Five years later a blast furnace, known as the Calumet stack of the Chicago Furnace Co., lessee, was constructed. This 18-ft. x 75-ft. stack, built in 1880, was served by one Massick & Crook and three Siemens-Cowper-Cochrane stoves. Connellsville coke and Lake Superior and Menominee ores were used. Annual capacity was 50,000 net tons of foundry and mill pig iron, sold under the brand name "Calumet."

Records at the plant go back to 1904. From that year to the present, a period of 25 years and 8 months, this furnace was in blast 19 years 6½



EIGHT Columns Support the New Furnace (Left) and Twelve Tuyeres Give It Blast. The clay gun is of the rotary type. The new unit, of 600-ton capacity, (lower, next page) stands in line with furnaces No. 1 and 2. This arrangement adds to the efficiency of the high line

BLAST furnace A of 250-ton capacity (top, next page) was built in 1880. The original blowing engines were still in use when the furnace was ordered dismantled last April

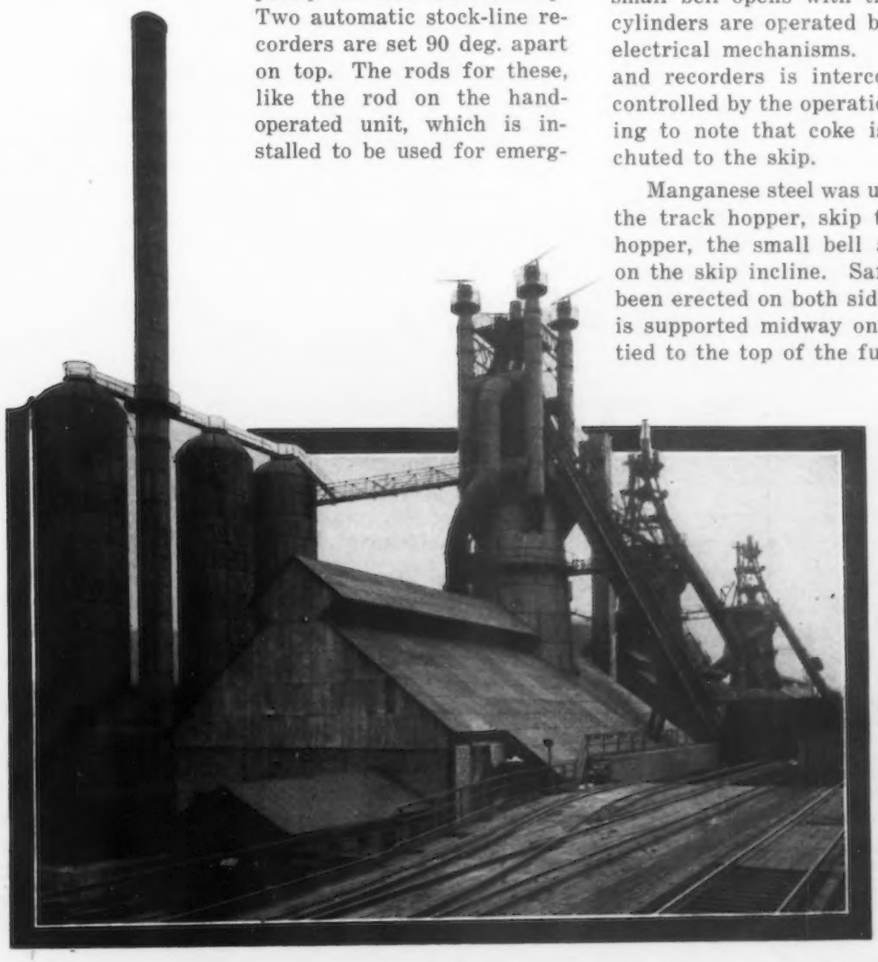
months, making a total of 1,681,983 gross tons of hot metal, or an average of 235 gross tons for each operating day.

In 1902 this property was acquired by the International Harvester Co., of which the Wisconsin Steel Co. is a subsidiary. The stack was made 5 ft. higher in 1907. Other changes were not of great importance, as is indicated by the fact that the cross-compound disconnected blowing engines, installed in 1880, were still in use on April 10, 1930, when the furnace was blown out for the last time.

Charging equipment for the new No. 3 furnace consists of roller bins with turning mechanisms, mounted on the two scale cars, each car having a capacity of 40,000 lb. in two bins. Each bin holds 150 cu. ft., which is the same as the cubical capacity of the double skip. Two automatic stock-line recorders are set 90 deg. apart on top. The rods for these, like the rod on the hand-operated unit, which is installed to be used for emergency purposes, are of the 2-in. continuous type.

Both the large and the small bell are operated by oil cylinders under a pressure of 750 lb. per sq. in. The large bell closes with the oil pressure and the small bell opens with the oil pressure. These oil cylinders are operated by hand levers connected to electrical mechanisms. The whole system of bells and recorders is interconnected and automatically controlled by the operation of the skip. It is interesting to note that coke is measured by volume and chuted to the skip.

Manganese steel was used for the scale car hoppers, the track hopper, skip tubs, coke chutes, receiving hopper, the small bell and the 85-lb. section rails on the skip incline. Safety screens 6 ft. high have been erected on both sides of the skip incline, which is supported midway on the cast house wall and is tied to the top of the furnace.



The furnace is equipped with four bleeders. Gas passes from the furnace to the dust catcher, which it enters tangentially through two downcomers. The gas then passes to a centrifugal dry cleaner and then to cooling and washing towers, which are 8 ft. and 14 ft. in diameter respectively. Gas then enters a common main, which discharges to four disintegrators, each immediately followed by an eliminator. A large main then conducts the gas to the stoves and the high-pressure boilers.

(*Concluded on page* 1795

Electrochemists Convene at St. Louis

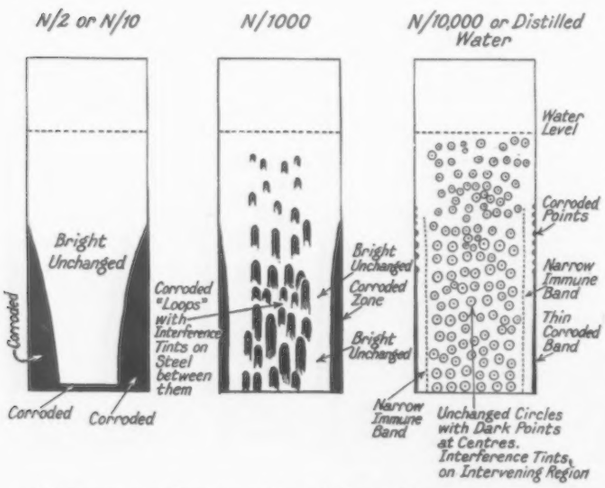
Developments in Electroplating and Hydro-Metallurgy —Endless Lengths of Seamless Tubing—Water Versus Fuel-Generated Power

MEMBERS and guests of the American Electrochemical Society convened at St. Louis the last three days of May. The main session of the program was devoted to a symposium on hydroelectric metallurgy at which T. H. Donahue of the Anaconda Lead Products Co. presided. A splendid array of papers was included:

J. J. Fingland on "Electrolytic Lead"; Charles T. Baroch on "Copper Leaching"; F. R. Corwin and C. S. Harloff on "Series Copper Refining"; five papers on "Electrolytic Zinc," the key topic of the convention; "The New Evans-Wallower Plant at East St. Louis," the first plant to apply the fuel resources of the Eastern States to the electrolytic production of metals from ore, by U. C. Tainton and Daniel Bosqui; "Studies on Zinc Ferrite," by Yogoro Kato and T. Takei of Tokyo (presented by Kato); "The Solubility of Zinc in Sulphuric Acid," by F. W. Harris; "Recovery of Indium Metal from Crude Zinc Liquors," by L. R. Westbrook; "Germanium in Relation to Electrolytic Zinc Production," by U. C. Tainton and E. T. Clayton; two papers on "Electrolytic Bismuth," by E. F. Kern and T. R. Jones; and finally a paper on "Electrolytic Nickel," by Colin G. Fink and F. A. Rohrman.

Germanium and Indium Isolated

OF unique interest were the papers on indium and germanium. Mr. Westbrook of the Grasselli Chemical Co. exhibited small ingots of indium, a white lustrous metal, very soft and ductile, slightly heavier than zinc. It occurs in small amounts in process residues obtained in the purification of crude zinc liquors, made from zinc cinder or blende containing traces of it. By treating the crude liquors with metallic zinc, indium if present is precipitated out, together with cadmium, lead, tin, antimony, copper and nickel. Over one pound of the metal was recovered from the residues for experimental purposes. Separation from most of the accompanying elements was accomplished chemically, and the final isolation by electrodeposition of the metal from a citrate bath, representing the best of several electrolytes investigated.



Diagrammatic Representation of Early Stages of Attack on Vertical Specimens of Steel H28 by Sodium Chloride Solutions of Different Concentrations.—Dr. Evans

Germanium as a Coating for Steel

Germanium likewise occurs in very small quantities in the zinc liquors and, as Messrs. Tainton Clayton emphasized, the metal must be eliminated in order to get good zinc efficiencies. It tends to deposit out on the zinc cathode and, if present in appreciable quantities, will destroy the cathode. Germanium is very resistant to corrosion and may in special cases form an ideal protective coating for steel.

Round Table on Water and Fuel-Generated Power

PROF. A. S. LANGSDORF of Washington University, St. Louis, presided at a well attended round table discussion on the timely topic of water power versus fuel power for electrochemical industries. Professor Langsdorf referred to a recent statement of the National Conference Board that "the rapidly increasing efficiency of fuel power plants is steadily reducing the coal equivalent of water power and, because of this factor, as well as because of the much higher investment required in hydroelectric installation, the production of fuel electricity is progressing more rapidly than that of hydroelectric energy." Even in countries such as Italy, in the very shadow of the Alps and obliged to import coal, thermal power stations are an economic proposition and indispensable.

An Improved Power Contract Suggested

Stanley Stokes of the Union Electric Light & Power Co., owner of that modern super-power plant at Cahokia, visited during the week by the A.E.S. members, presented a detailed brief in support of fuel-generated power, and suggested improved forms of power contracts. The prime power customer is to allow the secondary ("unrelayed") power customer the use of reserve equipment when not in use. In return the unrelayed power customer agrees to have his load curtailed on short notice in an emergency in order that the prime power customer may continue to obtain service. Mr. Stokes concluded that it is now possible to locate an industry centrally with respect to distribution, pay slightly more for power and considerably

Dr. Louis Kahlenberg

FOR President the Society Has Chosen Doctor Kahlenberg, Professor of Chemistry, University of Wisconsin, Madison, Wis. A charter member, he has been active in the society for years.

Doctor Adams was made an honorary member. Other honorary members are Dr. E. G. Acheson, Dr. W. D. Bancroft, Dr. Edward Weston and Dr. Thomas A. Edison.

Dr. Edward D. Adams

less for freight, and compete successfully with some of the lowest cost hydro plants remotely situated.

Diesel Engines in the Power Field

Dr. R. Schlatter, engineer of the Busch-Sulzer Brothers Diesel Engine Co., St. Louis, outlined the field of the Diesel engine in the modern power picture. It competes successfully with other sources of power in sections remote from the coal mines and within easy reach of oil fields or cheap supply of fuel oil. Diesel engines are ideal for peak load units of hydro or steam power plants.

John A. Fulton, director of the Nevada State Bureau of Mines, came out strongly in defense of water power, in particular Boulder Dam power. The price of power fixed by the Secretary of Interior is 2.15 mills per kwhr. for firm power and 0.8 mills for dump power at switchboard at dam. This may be compared with steam electric power at Los Angeles at 4 to 4.75 mills per kwhr.

Wide Interest in Electroplating

PAPERS on the plating of chromium, copper, silver, and copper-nickel alloys were presented and actively discussed. Of particular interest were the following: "The Production of Electrolytic Iron Printing Plates" by C. T. Thomas and William Blum of the Bureau of Standards, Washington.

Thick printing plates are being made at the U. S. Bureau of Engraving and Printing by depositing iron from baths that contain about 3 *N* $FeCl_2$, 2 to 4 *N* $CaCl_2$, and 0.01 *N* HCl. A cathode current density of about 7 amp. per sq. dm. (65 amp. per sq. ft.), is used and a temperature of about 90 deg. C. (194 deg. Fahr.). The anodes are suspended in porous alundum diaphragms. The deposited iron has a tensile strength of about 4000 kg. per sq. cm. (56,000 lb. per sq. in.) and an elongation of about 20 per cent. The finished plates are plated with chromium to increase the resistance to abrasion.

In discussing the paper Dr. Robert M. Burns of the Bell Telephone Laboratories, New York, referred briefly to the Hawthorne plant of the Western Electric Co. where electrolytic iron had been purposely made brittle whereas the samples displayed by Dr. Blum were ductile. Dr. Colin G. Fink of Columbia University emphasized that either a brittle or a ductile metal could be deposited, depending on conditions. Benjamin Miller of Henry L. Doherty & Co. confirmed this. Dr. Francis C. Frary of the Aluminum Co. of America pointed out the relative stability of ferrous chloride solutions in the presence of air. Even stirring with air will not readily produce the ferric salt.

Seamless Steel Tubing of Any Desired Length

TWO methods of making seamless copper or iron tubing in endless lengths were offered by Prof. Jean Billiter of the University of Vienna. In the first method metal is deposited on a short, slightly conical mandrel of chrome or silicon steel (to which the deposit does not adhere), and at regular time intervals the tube is moved slightly forward over the mandrel, thereby exposing a short, bare section of mandrel. During the next time interval, a new deposit forms over this bare section and also over the deposit produced during the previous time interval.

In the second method a low-melting hollow mandrel (lead) is slowly passed through a plating cell. Sketches of the apparatus used and photographs of the finished product were included.

Status of Electric Furnace Iron

G. L. Simpson, chief electrical engineer of the Pittsburgh Electric Furnace Corporation, presented a brief summary on the present status of electric furnace iron.

In the application of electric furnace processes to the production of gray iron, decided advances have been made during the past eight years, said the author. In the continuous duplexing process described, the metal is melted in the cupola, with just as little coke as will make it run properly, and is then transferred to the electric furnace. In the preferred continuous melting process, a cold charge is melted directly in the electric furnace, and, as soon as composition is corrected and the temperature is high enough, part of the molten metal is tapped, and immediately thereafter the equivalent amount of cold metal is charged. This

process is of decided commercial importance. At one of the plants 11 tons of gray iron is being tapped every hour. The process has a wide field of application.

Reproducibility in Corrosion Work

RESULTS of further researches on corrosion were submitted by Dr. Ulick R. Evans of Cambridge University, whose visit to America a few years ago will be recalled by many.

Lack of agreement between two "identical" corrosion experiments may be due (1) to experimental causes, such as non-uniformity of material, surface condition, or physical conditions, especially those affecting the oxygen supply; (2) to fundamental causes, which can be discussed from the probability standpoint. Corrosion usually starts from independent points, believed to be weak places on an invisible oxide film, and, where the number of these points on each specimen is small, considerable variation from the mean is to be expected. There is, however, evidence that each breakdown gives protection to the surrounding territory, thus decreasing the probability of other breakdowns, and this automatically makes the reproducibility better than that which would be calculated from Poisson's formula.

Prizes and New Officers

AT the annual business meeting reports were received from various committees. The society's prize to young authors for the year 1929 was awarded to Dr. William C. Gardiner of Princeton for his excellent papers on the Weston standard cell. The second Weston fellowship was awarded to Dr. Karl Soellner of Berlin who will carry out his researches under Prof. Herbert Freundlich, recently visiting professor at the University of Minnesota.

Honorary membership in the society was bestowed upon Dr. Edward Dean Adams who was so largely responsible for the development of electric power for electrochemical purposes at Niagara Falls.

New Officers

Report of the tellers of election was presented by the outgoing president, Francis C. Frary. The new president is Louis Kahlenberg of the University of Wisconsin, a charter member of the society. The new vice-presidents are: Bradley Stoughton of Lehigh University; Hugh S. Taylor of Princeton; George W. Vinal of Washington; managers: D. A. Pritchard of Windsor, Ontario; M. R. Thompson of Washington; and Alexander Lowy of Pittsburgh. Acheson Smith, as treasurer and Dr. Colin G. Fink, of Columbia University, as secretary, were reelected.

Social Gatherings and Excursions

The local committee, headed by Carl Hambuechen, had provided a very interesting social program. Of particular interest was the excursion to the lead mines and mills at Flat River, Mo., occupying all of Saturday. Friday evening President Frary delivered an address on "Research as a Vocation" and Dr. George Moore, director of the Missouri Botanical Gardens, second to the finest in the world, gave an illustrated lecture on sex life in plants.

Among the plants visited by the members were those of the Busch-Sulzer Diesel Engine Co., Cahokia Power Co., Koken Co., Evans Wallower Zinc Co., and Laclede Christy Clay Products Co.

Fall Meeting to Be Held in Detroit

The fall meeting of the society will be held at Detroit, Sept. 25 to 27, the Hotel Statler being convention headquarters. The main technical sessions will be devoted to prevention of corrosion in the automotive industry and electric furnace alloys.

Handling Monel Metal and Nickel in the Foundry

IN casting Monel metal and nickel every care should be taken to permit the easy escape of the gases, said E. S. Wheeler, International Nickel Co., Bayonne, N. J., in a paper, "Monel Metal and Nickel Foundry Practice," before the Institute of Metals division of the American Institute of Mining and Metallurgical Engineers.

For the reason that these metals are susceptible to harm from the action of gases, the use of gas-producing ingredients in molding materials should be reduced to a minimum. Manganese and sulphur are both detrimental; manganese causes the metal to cut the sand badly and, in addition, causes heavy shrinks, while sulphur in excess of 0.030 per cent makes the metal hot-short and brittle. A good grade of refractory molding sand should be used for the molds.

Because of their high shrinkage, Monel metal and nickel castings are likely to develop shrinks and pulls which can often be overcome by a change of molding practice, the use of heavier fillets, a change of mixture, the elimination of all or part of the scrap used in the charge, or a change in the core when present to permit the casting to solidify without any strain being set up by the excessive hardness of the core. Scrap should be kept down to a minimum and should not exceed 25 per cent of heavy scrap or 10 per cent of light scrap. The use of excessive quantities of scrap is frequently responsible for heavy pulls and sometimes causes porosity due to the oxidation of the silicon, which is usually present, and to the evolution of gas picked up during remelting.

Melting should be accomplished as quickly as possible, but not at so fast a rate as to oxidize the metal. In the crucible pits about two hours should be necessary to melt Monel metal in crucibles containing 175 lb. of metal, and slightly longer for nickel. This melting rate applies to a hot furnace; obviously, the first melt will require a slightly longer time. The most important factor necessary for the production of good Monel metal or nickel castings is suitable equipment. Without the proper furnaces no amount of good molding or good foundry practice will produce satisfactory castings.

Bulletin 206 of the Engineering Experiment Station, Urbana, Ill., describes some attempts to deposit strongly electropositive metals, like aluminum, titanium, vanadium and tungsten from complex organic solutions. Aluminum was found to be the only metal which could be plated in this manner, and a brief account of a method usable for small subjects is given.

Drawn Stampings of Rustless Steel

Chrome-Nickel Steel and Chromium Steel Used for Varying Types of Hub Caps—Their Qualities Differ

RUSTLESS steel has taken an important place in the automotive industry this year as a competitor of chrome-plated material in the manufacture of the smaller bright-finished parts. It is winning favor as a material for these parts because of its permanent rustproof qualities. Hub, radiator and gas tank caps of rustless steel are being made on a production basis by the Eaton Axle & Spring Co., Cleveland, in the plant of its Easy-On Cap Division.

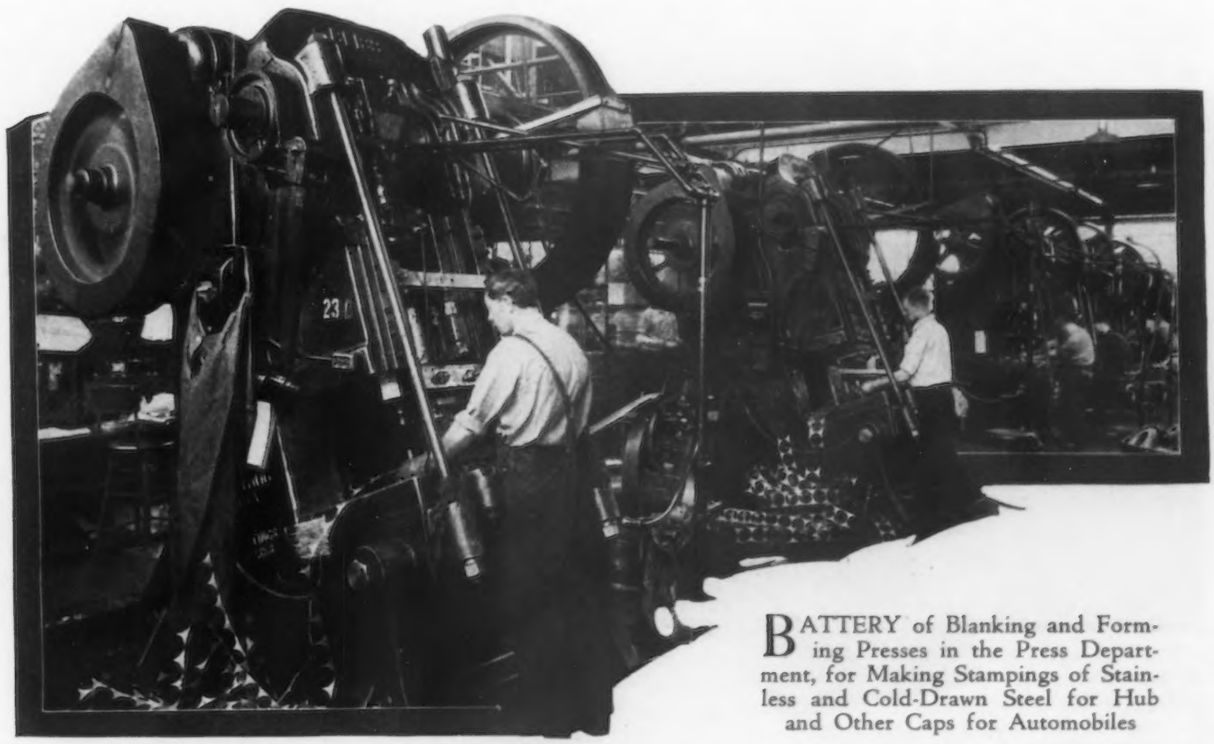
Using Two Types of Steel of Varying Characteristics

This new specialized plant is arranged for the manufacture of hub, radiator and gas tank caps and accessories, and is equipped for making either rustless steel or chrome-plated caps. It has a capacity of over 1,000,000 caps a month and the same number of necks and flanges. The same forming equipment is used for making the rustless steel and plain carbon steel stampings, and to some extent the same polishing and buffing equipment finishes the caps made from both steels. The plant is well arranged for convenience in routing work and for economical production.

Two grades of rustless steel are used in manufacturing caps, depending on the wishes of the customer. One is a high-chrome-nickel steel containing 18 per cent chromium and 8 per cent nickel, and the other is a plain chromium steel containing 18 per cent chromium and no nickel. Because of its increased ductility, due to its nickel content, the chrome-nickel steel is easier to draw than the plain chrome steel, although the latter has the advantage of being a cheaper material. The chrome-nickel grade is also slightly easier to polish and buff.

In appearance the finished chrome-nickel cap has more of a yellow tinge than one made of chrome steel, but the difference is so slight that it is difficult for anyone but an expert to discern, even on close inspection. The plain chrome steel is found satisfactory for caps requiring only a light draw, when the color suits the customer's requirements.

Comparing manufacturing costs with caps made of plain carbon steel, the chrome-nickel steel is harder to draw because of its toughness, and slightly harder to polish and buff than the cold-rolled plain carbon steel. But the increase in cost of these operations is largely offset by what is saved in plating and in buffing after



BATTERY of Blanking and Forming Presses in the Press Department, for Making Stampings of Stainless and Cold-Drawn Steel for Hub and Other Caps for Automobiles

plating. It is stated that a small cap can be made from the 18 per cent chrome-8 per cent nickel steel at about the same cost as one made from the plain carbon steel chrome plated, but that the cost of a large cap, such as the present styles demand for hub caps, is considerably more when made of the chrome-nickel steel than when made of plain cold-rolled steel, because of the amount of steel required for each hub.

Methods of Manufacture

DEEP-DRAWING operations are not required in making caps and the parts are formed without any annealing operations. The company has tried, experimentally, annealing at 1000 to 2000 deg. Fahr. between drawing operations. While the increase in hardness resulting from working the steel was relieved to some extent by annealing, this operation tended to discolor the metal.

Cold-rolled steel, mostly in 0.025-in. gage, is used for all caps, whether made of rustless steel or plain carbon steel. This is received from the mills in coiled form in various widths. Aluminum, used in making one type of caps, as well as brass, are received also in coiled form.

The deepest drawing required on any part is 1⅛ in. on the skirt or lower section of a radiator cap. The top part of this cap, when the chrome-nickel steel is used, is made with one operation during which the piece is blanked, formed and trimmed. The 1⅛-in. draw on the skirt is done in one operation, which is followed by two trimming operations. The operations on the two parts are the same in number for the plain steel.

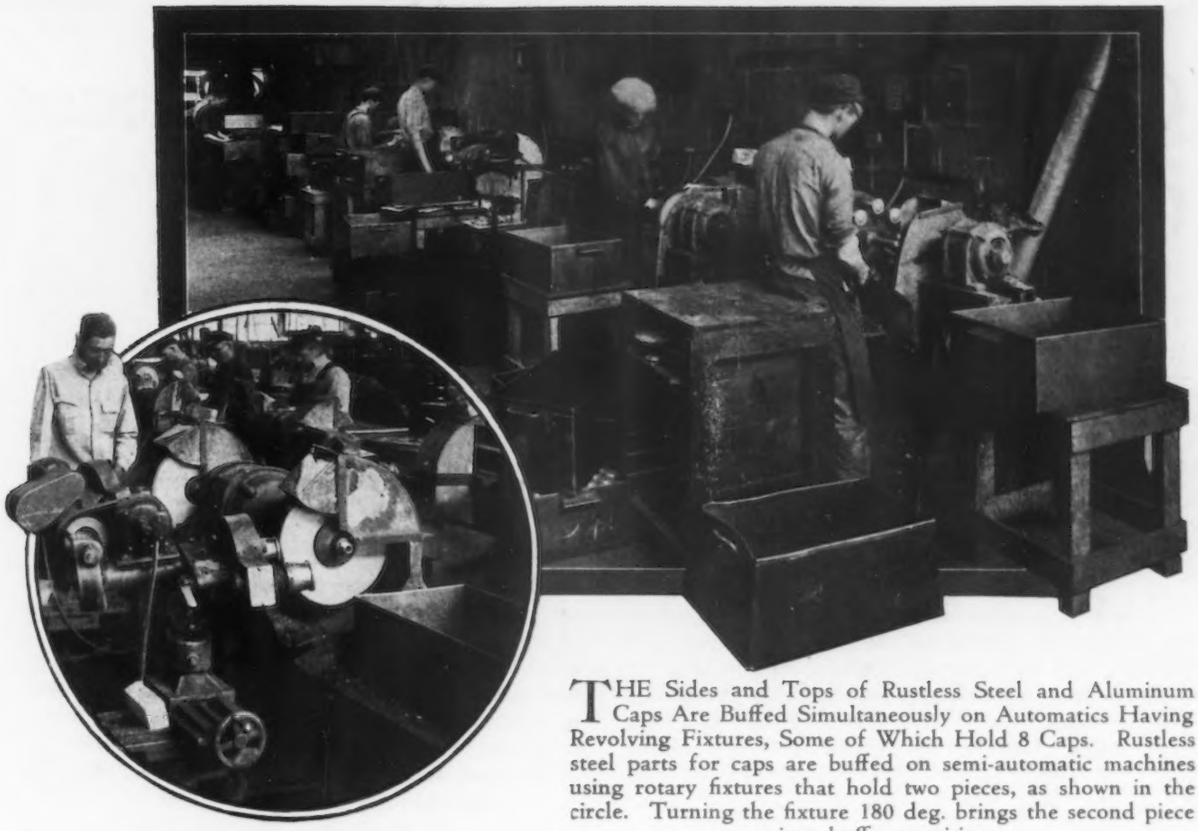
There is the same set-up of the press equipment, although stronger dies are used for the tougher chrome-nickel steel, because of the heavier impact necessary for forming the material. More accurate dies are required and the dies are ground oftener. The plain chrome steel is harder to work than the chrome-nickel steel, because of its lower ductility. Draws on this can be made of only about one-half the depth of those on the chrome-nickel steel. The skirt with a 1⅛-in. draw requires two drawing operations for the chrome steel, as compared with one for the chrome-nickel material.

Six Million Pieces in a Month

Stampings for large-production work are made on a battery of four automatic presses or dieing machines built by the Henry & Wright Mfg. Co. As many as 6,000,000 pieces have been made on these machines in one month. When an order is not of sufficient size to warrant setting up these machines for the job, the operations are performed on standard blanking and drawing presses.

Most radiator caps are knurled, the knurling operation being performed on a battery of standard knurling machines. The high finish to produce caps with the desired luster is obtained with automatic and semi-automatic polishing and buffing machines. Use of late improved types of these machines enables the users to speed up produc-

CHROME Plating Equipment Appears at Right and Nickel Plating Equipment at Left. Overhead electric monorail handles work in and out of plating tanks, and an overhead chain-type conveyor carries the pieces from plating department to buffing machines



THE Sides and Tops of Rustless Steel and Aluminum Caps Are Buffed Simultaneously on Automatics Having Revolving Fixtures, Some of Which Hold 8 Caps. Rustless steel parts for caps are buffed on semi-automatic machines using rotary fixtures that hold two pieces, as shown in the circle. Turning the fixture 180 deg. brings the second piece into buffing position

tion, improve the quality of the work and at the same time to reduce the cost of these operations. After forming on the presses, the pieces are polished on automatic polishing machines equipped with from three to six polishing wheels. Then they are buffed on semi-automatic buffing machines.

The assembling operations follow. Inside parts for caps are made of cold-rolled steel, being formed on either automatic or standard presses. After forming they are cadmium plated, for protection against corrosion, in a barrell-type plating machine. The spring required for holding the radiator cap in place is either spot welded, crimped or riveted to the inner part of the shell.

After assembly, the caps are either dry buffed on automatic machines or wiped by hand. The buffing is done on two-wheel machines. Very little compound is used—only enough to keep the wheels from becoming extremely hot.

Other Specialties, Made of Brass

Radiator necks or flanges are made of strip brass, either on the automatic presses or on standard presses. Gas tank necks and flanges are made of cold-rolled steel. These are blanked on the automatic presses and drawn on drawing presses. Some of the necks are 6 in. long and require six drawing operations. Necks of such length as to require several drawing operations are annealed once between these operations. When specifications call for copper plating, the necks are plated in a barrel-type plating machine.

Some of the hub caps made in the prevailing decorative styles require japanning on a portion of the face of the cap. The japan is sprayed on in one of two booths, a mask covering the portion of the bright surface that is not to be japanned. After japanning they are given a low-temperature bake in a conveyor-type oven, in which they are kept 90 min.

Plating Caps of Carbon Steel

A plating department equipped with semi-automatic plating equipment is provided for plating caps made of plain carbon steel. The usual sequence of operations is followed, the pieces being copper plated, nickel plated, nickel buffed, chrome plated and chrome buffed, after which they go to the assembly department. Some of the nickel buffing is done on the automatic machines used for buffing chrome-nickel and plain chrome steel parts.

An overhead conveyor carries the pieces from the nickel plating tank to the buffing machines, back to the chrome plating department and from that back to the machine for the final buffing operation. The pieces are handled on the conveyor in 18 x 24-in. trays set on a carrier suspended from the conveyor chain. Work is handled in and out of the chrome plating tank by an electrically operated monorail. Sheet-metal tote boxes in a standard 15 x 24-in. size are used in handling parts through the plant, from the presses to the various operations outside the plating department.

All caps are given a 100 per cent final inspection. There is, also, a 100 per cent process inspection of the rustless steel parts after buffing, and of the parts made of plain steel after polishing and nickel buffing and after the finish chrome buffing.

Operating Open-Hearth Furnaces

Temperature Measurements and Observations—Use of Instruments for Control—Heavy Fuel Oil—Absorption of Sulphur

OPEN - HEARTH operators, meeting in Buffalo, May 20 and 21, threshed out many difficult problems of their calling, the largest items of which were published in our issues of May 30, page 1601 and June 5, page 1669. What follows in the remaining paragraphs covers the rest of the discussion and also the visits made to the Lackawanna steel plant and that at Hamilton, Ontario.

How and Where to Take Temperatures

There was some discussion as to temperature measurements, both as to the place of taking temperature and the method. Thermocouples connected with recording instruments are common. These are used for stack temperatures, checker chambers and in other places. One man found readings of about 1100 deg. at the bottom of the checkers on the outgoing end.

Another man, who had his thermocouples in the fantail, lost some of them through burning out. One plant has an instrument in the checker chamber 3 ft. in from the bridge wall. Still another, who uses a platinum-iridium tube, found his temperatures getting up occasionally to 2400 deg.

Thermocouples above the checkers in the regenerators at the plant of the Steel Co. of Canada were observed in operation when the open-hearth men visited that plant on May 22. These were registering between 2100 and 2300 deg., the variation from one chamber to the other being perhaps 100 deg. From the top temperature before reversal to the bottom temperature before the next reversal the range was about 100 deg.

One speaker pointed out that it is doubtful whether these thermocouples give the exact temperature at the point where they are installed. He called attention to the radiation effect from the roof and other surfaces as tending to influence the reading of the instrument, making the indication considerably higher than it should be.

Some Companies Provide Furnace Glasses

Open-hearth glasses formed the subject of an experience discussion in which it developed that many of the companies have standardized upon a certain glass and are furnishing these glasses to all of the new men and to such of the older men as want them. In some cases they are sold to the men at cost, having been bought at wholesale. In others they are given to the men, and have to be accounted for. In some cases repairs are made free.

In the case of the older men who have their own glasses, and are accustomed to them, no attempt is made to change the glass. In this connection, however, a number of men have been required by the company to have their eyes tested when it was found that they were not getting results—burning the roofs or causing some other trouble.

Instruments for Furnace Control

INASMUCH as the temperature of producer gas is an incident to the operation of the producer—an effect rather than a cause—a combustion man argued that this temperature should not be used as a starting point for control. Variations in the operation of

the producer at different times during the heat may change the rate of coal burning by as much as 35 or 40 per cent above or below the average hourly record.

Control of the producers, whether by steam or otherwise, is for the most part in the hands of the melter, the valve being near the furnace controls. This practice was criticized by several operating men, who have placed the control in the hands of the gas man completely and then placed upon him the responsibility to furnish enough gas of a given quality to satisfy the demand of the melter. Electric signals from the melter to the gas house tell the gas man what is wanted. In some of these cases regulators for the gas are employed.

Another combustion engineer expressed the belief that the same results can be obtained on a furnace whether the operator manipulates his steam valve or the gas valve. As the latter is harder to operate, it is usually the steam valve which is touched. By placing an electric motor on the gas valve, however, it has become just as easy to operate this, and this method has been adopted in some plants.

Use of Heavy Fuel Oils

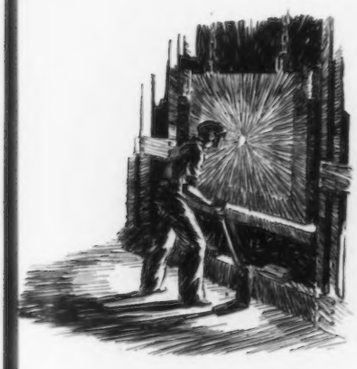
CONSENSUS of opinion appeared to be that the heavier the oil burned the more sediment would be found in the regenerators. This was not universally reported, but appeared to be fairly general. For this reason some plants burn oil of 16 to 18 deg. Baumé and will not use the heavier grades. In other cases, however, practice is standardized on oil of 4 to 8 Baumé and little trouble is reported. This oil has to be preheated and is delivered to the burners at about 170 deg. Fahr.

While the heavy oil was reported to clog the checkers, the lighter oil was stated in some cases to burn them up, through its excessive temperature. Little difference was reported in fuel efficiency, even though the heavier oil has nominally a greater B.t.u. content to the gallon.

One operator reported that sodium salts from the oil have a tendency to eat away the checker brick. Another operator stated that analysis of the bottom sediment of the oils he is using showed that it consists primarily of three things: sodium salts, sand and dirt.

Absorption of Sulphur from the Coal

ABOUT 1 per cent of sulphur in the coal, or a little less, is neutral, according to a statement of Dr. C. H. Herty, Jr. Anything above this will give something of a pick-up of sulphur into the steel from this source. With oil or tar, however, the neutral point is at about 0.60 per cent sulphur.



In connection with this matter one operator made the sensible suggestion that the absorption of sulphur in the steel from the fuel may be one thing with a furnace which burns 450 lb. of coal to the ton of ingots, and quite a different thing in a furnace running up to 700 lb. or so. The latter might give considerable trouble if the coal has high sulphur.

Manganese to Neutralize Sulphur

If sulphur troubles are likely, the use of high-manganese pig iron is a distinct help, Doctor Herty stated. Sulphur content in the coal and in the limestone of the charge are not the sole factors in this regard. Care in making the heat is just as important as care in selecting the materials for making the heat. One operator stated that the sulphur in the limestone may reach anywhere from 10 to 30 per cent of the total sulphur present in the furnace.

Use of slightly superheated steam was reported to give difficulties in the valves controlling it. The operators stated that they had obtained valves in which the seats were of Monel metal and the entire valve structure designed specifically to handle a superheated steam temperature of 700 deg. or so. These were reported to be giving good service. Two different makes of valves were named.

Influence of Charging Time on Quality

MUCH of the light scrap at present available for open-hearth melting is so bulky that frequently a portion of the scrap has to be melted down before the rest can be got into the furnace. In plants where this is the case, and the scrap has to go in in two or more drags, it sometimes takes several hours before the furnace is fully charged. No one reported tracing any influence on the quality of the steel to this condition of delayed charging. It does, however, make a considerable difference in the time of getting out the heat, and naturally is not favored.

Plant Visits Feature Furnace Control

TWO plants were visited by the assembled open-hearth men, fully 100 going to the Lackawanna plant of the Bethlehem Steel Corporation on Wednesday afternoon, while approximately 70 visited the main plant of the Steel Co. of Canada at Hamilton, Ontario, on Thursday. Both plants have furnaces operating in which combustion control is taken care of by instruments. In both cases the air supplied for the fuel being burned is tied in accurately so as to give a slight excess—1 or 2 per cent—and then any change in the fuel supplied to the furnace involves automatically a corresponding change in air for combustion.

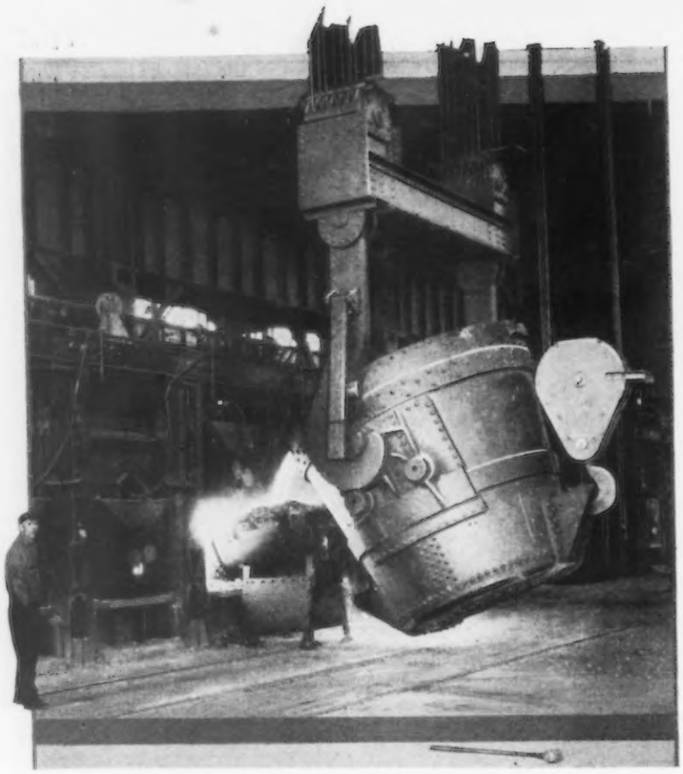
At the Lackawanna plant one furnace is operating under Smoot control, furnished by Smoot Engineering Corporation, 136 Liberty Street, New York. Another furnace is having similar equipment installed. At the Steel Co. of Canada plant two furnaces are operating on a mixture of coke oven and blast furnace gas, controlled in part by Shallcross Control Systems Co. apparatus and in part by equipment furnished by the American Heat Economy Bureau, Pittsburgh. Shallcross stack draft regulators and fuel gas regulators are in use and a Hagan combustion controller.

Men Have Become "Sold" on Control

In both plants the apparatus has been operating long enough so that the furnace men are thoroughly familiar with its characteristics and appear to like it very much. The reports show not only better com-

bustion, with consequent fuel economy, but also a better tonnage. Incidentally, uniformity of combustion is having its effect upon the refractories and giving a much increased life to furnace roofs and other portions.

Twenty-two of the 24 furnaces at Lackawanna were found operating, this being above the average rate of operation for the country. These are in two shops of 10 and 14 furnaces, respectively, and one of the controls has been placed on a 100-ton furnace in each shop.



Each of the fully controlled furnaces at Hamilton is of 133 tons capacity. The four other furnaces in the shop are of 88 tons. All six furnaces were in full operation. Both of the large furnaces and one of the smaller ones are on the coke oven and blast furnace gas mixture. One of the smaller ones is burning tar, while the two others are operating on a mixture of producer gas and blast furnace gas—mostly the former. Both controlled furnaces are insulated with Sil-o-cel, with regenerators encased in steel plate to prevent infiltration of air.

Melting is started on these furnaces with a ratio of about two volumes of blast furnace gas to one of coke oven gas. As the heat proceeds this ratio enlarges until, shortly before tapping, the figure becomes about 3 to 1. Recording instruments showed a stack temperature running about 1000 deg. Fahr., with a great uniformity, and showed the regenerator temperatures measured at the side and part way through the chamber to average about 2200 deg.

Reversals are made manually upon a light signal. There are telltales and lights interconnected with the system, so that the operator always knows exactly what is going on. The gas is so light that it is difficult to see it as it enters from the port. During the 10 min. interval between reversals the outgoing regenerator heats up about 100 deg., and then drops a similar amount while the gas is running in the opposite direction.

To secure the benefit of a large outgoing port each of these furnaces has three uptakes, only one of which is used for the incoming air, the other two being closed by dampers. At the outgoing end these dampers have been withdrawn, thus giving the extra passage for the outgoing gases. This shifting of dampers takes place at the reversal of the furnaces. The gas enters from both sides of the furnace, just ahead of the air inlet, being mixed at that point with the incoming air.

Two gas holders of 1,000,000 cu. ft. each are used in connection with the operation of this plant. One takes blast furnace gas and serves as a balance wheel during casting time, etc.; the other handles the coke oven gas and acts similarly as a balance.

German and American Duplex Methods Compared

DIFFERING in essential points from the duplex process as practised in the United States, A. Jung in *Stahl und Eisen*, Vol. 49, pages 1221 to 1224, describes the carrying out of the duplex process in Germany. It involves the finishing in the open-hearth furnace of charges blown in the basic Bessemer converter.

The open-hearth furnace is first charged with 4.15 tons of manganiferous pig iron, 6.35 tons of heavy scrap, 3.1 tons of light purchased scrap and 2 tons of turnings; one ton of limestone is added to this. After two hours, a charge of 22.1 tons from the basic converter is poured in, the composition of this being carbon 0.025, manganese 0.30, phosphorus 0.124, sulphur 0.039 per cent. The charge is ready for tapping at the end of another hour.

The yield amounts to 36 tons of ingots, of which the final composition is: Carbon, 0.09, manganese 0.26, phosphorus 0.02, and sulphur 0.027 per cent. Fuel consumption in coal is reported as 12.03 per cent of the weight of the steel produced, which compares, says the author, very favorably with a fuel consumption of 19 per cent in the scrap-pig process.

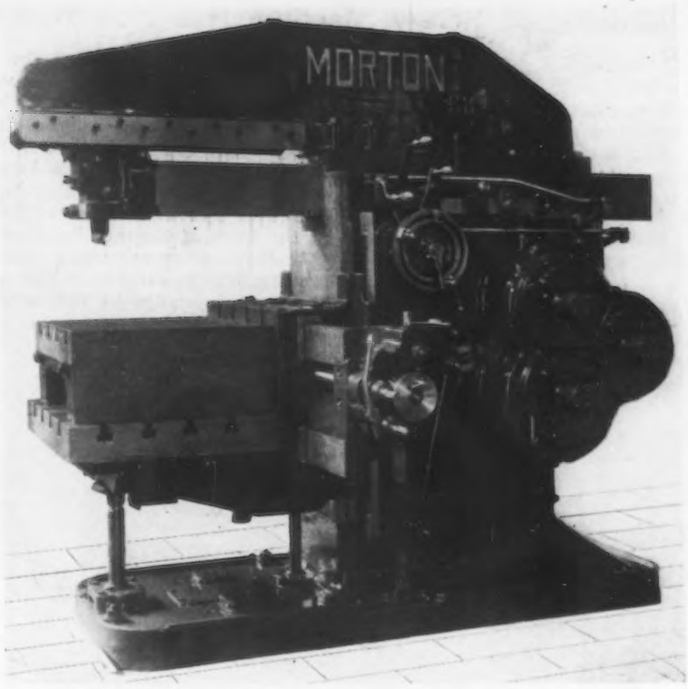
In blowing the converter charge, no additions were made, the charge consisting of 22.7 tons of basic pig and two tons of scrap. Production of the open-hearth furnace by this process was raised from 180 tons per day by the ordinary process to 280 tons per day. Economy in fuel and increased output are offset partly by the use of manganiferous pig iron in the open-hearth containing 4.28 per cent manganese, this being more expensive than ordinary scrap.

Adds to Line of Draw-Cut Shapers

A HIGH - DUTY draw-cut shaper with overhead extension ram cap bearing and screw-type outer support has been placed on the market by the Morton Mfg. Co., Muskegon Heights, Mich. In addition to maximum rigidity, eliminating spring or deflection of the ram regardless of the length of stroke, the construction is claimed to assure proper alinement of the table and work at all times.

The overhead ram cap bearing is of ribbed box construction. The front or operating side of the machine is open on three sides, so that the operator may stand in the most advantageous position when setting or removing work or when operating the machine. The arrangement also provides freedom for chip removal. A special tool head is used. This head has an adjustable taper bearing forming a support to the cutting tool both top and sideways, eliminating deflection of the ram. It is accurately fitted to the threaded end of the ram and may be held at an angle when desired by means of a quick clamping device. It is provided with a radially adjustable bearing above the cutting tool and with a wedge taper bronze gib for compensating wear. The bearing against which the head operates is of special composition and is so fitted to the extended ram cap bearing that it may be removed and refitted should the need arise. Rapid power traverse, both horizontal and vertical, is standard on these machines.

Draw-cut shapers equipped as illustrated can be furnished in 32, 38, 48 and 60-in. stroke sizes. They are offered for use in die shops, industrial plants and railroad shops.



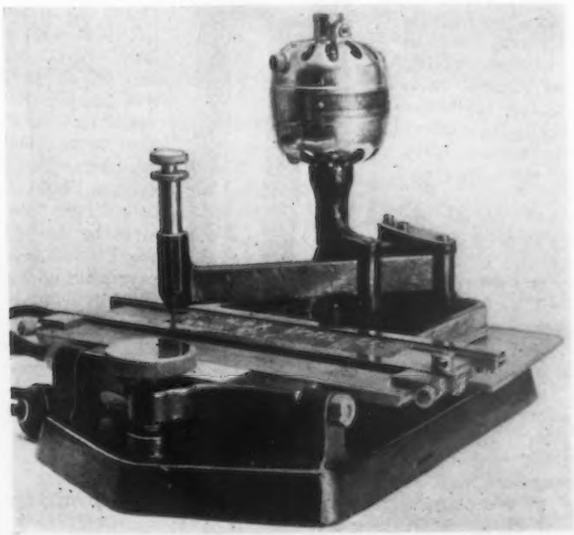
Overhead Extension Ram Cap Bearing and Screw-Type Outer Support Are Features

Engraving Machine for Various Materials

AN engraving machine for the marking of flat gages and other pieces made of soft steel, brass, aluminum, hard rubber or bakelite, and for making name-plates and engraving serial numbers on panels has been placed on the market by the Simplex Tool Co., Woonsocket, R. I. Pieces up to 14 in. in height, any length and up to ⅞ in. in thickness can be engraved.

Practically no set-up is required for operating this machine. To insert the piece to be engraved, the large headed screw at the front is loosened and the upper back part of the machine (which hinges at the front) is tilted upward. The work is then set between this hinged part and the base and is clamped in place by tightening the screw at the front.

Engraving is done on the pantograph principle, individual letters set up on the table of the machine to form words being engraved by the cutter attached to the motor. The engraved letters are approximately one-third the size of the master letters on the table. The tracing pointer moves in and out of its socket as pressure is applied or released by hand. A spring in back of the tracer serves to raise the tracing arm and keep the cutter away from work when pressure of hand is removed. The space engraved at one time is approximately 3 x 1 in., but due to the ease with which work can be released and slid along a bottom rest, a long line of letters may be engraved rapidly.



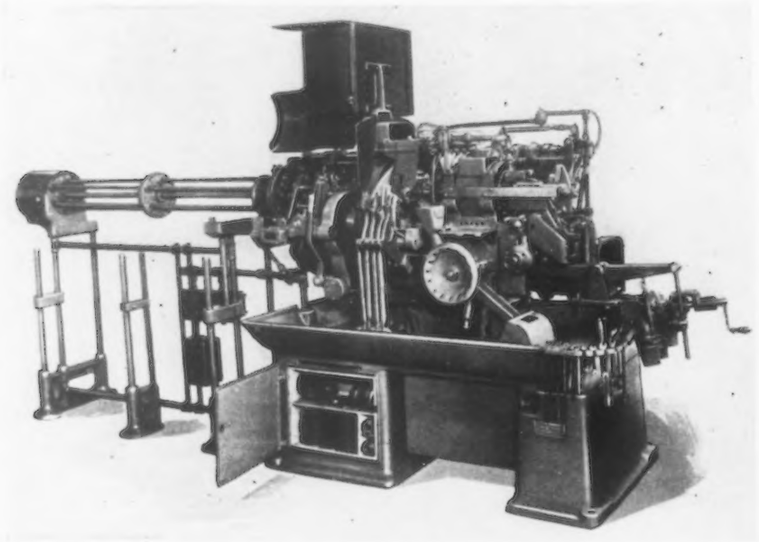
The Space Engraved at One Set-Up Is Approximately 3x1 In. A line of letters may be engraved rapidly

Independent Pneumatic Tool Co. Expands

The Independent Pneumatic Tool Co., 600 West Jackson Boulevard, Chicago, manufacturer of Thor electric and pneumatic tools and air compressors, has purchased the Cochise Rock Drill Mfg. Co. of Los Angeles. This purchase is part of an expansion program inaugurated a year ago. The Cochise Company manufactures rock drills and mining tools. The plant of the Cochise Company will be expanded, additional workmen will be employed and the products manufactured will be incorporated in the present line of the Independent Pneumatic Tool Co.

Redesigned Screw Machine Has Box Base

A REDESIGNED automatic screw machine having a box base and a system of guards has been placed on the market by the Davenport Machine Tool Co., Rochester, N. Y. The box base has a place for gears and cams, and the guards are arranged so that they may be turned up out of the way while tools are being adjusted. A chip conveyor which discharges the chips into a tote box or other container is also provided. The machine is said to be equally efficient on either brass or steel work.



Operating and Set-Up Time Have Been Reduced and the Screw Machine Made More Universal for Jobbing Work. The guards may be removed or turned up out of the way (as shown) while tools are being adjusted and closed down when the machine is in operation

Each of the five "turret" tools and four cross-slide tools has independent movement, this separate feed and length adjustment for finishing being said to assure better finish and longer tool life. A fifth cross-slide can be added. All operations are performed simultaneously, the actual time for a given piece being the time of the longest operation plus ½ sec. Frequently the longest operation can be divided into two or more short operations on different spindles. Tolerances of 0.001 in. and better can be maintained with suitable tool equipment.

The work-spindle head is supported on the outer end of a pair of rollers, which takes care of the overhang and also the weight of the wire case carrier. Locating blocks are hardened and ground. Work spindles are hardened, ground and lapped and run in phosphor-bronze bearings; thrust is taken on a double row ball bearing in the rear box.

The spindle drive is by an internal gear running on the hubs of the spindle gears, and indexing is by means of a Geneva disk. Stock feeding occurs while the head is indexing. The length of the stock feed may be adjusted by a small crank located conveniently at the top of the feed slide lever. The stock feed cam, which also operates the chuck, is a hardened steel forging built as a unit with the worm wheel and crank that operates the Geneva disk, eliminating lost motion between the various movements. This unit is mounted on a short shaft at the front of the machine, together with the locating cams and cams operating the cross-slides. The camshafts are operated at two different speeds, one-half of the revolution being made in ½ sec. and the other half revolution according to requirements of the job.

Each tool spindle has its own cam. The tool spindle levers have a graduated face where a sliding block, connected to the tool spindles by a turnbuckle, may be raised or lowered from the center line of the spindle to vary the feed as much as 20 per cent of the rise of the cam. The tool spindle camshaft clutch disconnects the tool spindle camshaft from the driving worm wheel so that the "turret" tools can remain in back position while the cross-slide tools operate as usual. This is a convenient feature when tooling up or feeding stock into the machine.

Two separate clutches operate the camshaft. One, the high-speed clutch, is of single-plate type and is at the rear of the machine; the other is a low-speed clutch of "roll-away" type. The latter is located in the feed change gear box at the right-hand end of the machine and is integral with the driven feed change gear. Change from one feed to another involves changing only one gear. The 5-hp. 1800-r.p.m. driving motor is mounted on a swinging platform and may be adjusted conveniently to compensate for wear of the silent chain drive. From the driven sprocket at the back of the machine a shaft drives both the spindle and the feed change gears.

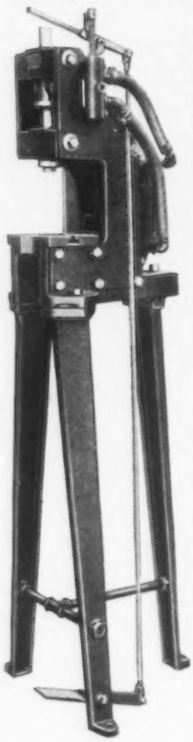
The company's threading clutch is said to be equally efficient on either brass or steel work. With an extra threading spindle, it is possible to thread in more than one position at the same time. Ten threads, of any pitch, on brass work can be cut with a solid die or tap in 1 sec. Self-opening dies, either rotating or non-rotating, can also be used. When using a non-rotating die head on brass work, 16 threads of any pitch can be cut in 1 sec. Screw slotting, burring, cross drilling and other attachments can be furnished.

This automatic screw machine, designated as the model B, has a regular capacity of the feed tubes of ½-in. round, 7/16-in. hexagon and ⅜-in. square. Special feed tubes with fingers soldered in can be furnished for larger stock. The maximum length fed is 3 in. and the maximum length turned is 2½ in. Spindle speeds, 11 in number, range from 600 to 2400 r.p.m. Feed gear changes number 29 and the range of feed gears is from 1 to 20 sec.

Other specifications are: diameter of circular tools, 2 in.; outside diameter of tool spindle, 1⅜ in.; least distance between chuck and tool spindle, 2⅛ in., and greatest distance, 4 13/16 in. Floor space of 36 x 176 in. is occupied and the net weight of the machine is 3200 lb.

Air-Operated Arbor Presses

THE arbor press here pictured has been placed on the market by the Tomkins-Johnson Co., Jackson, Mich. It is made in 1000, 4000, 6000 and 12,000-lb. sizes, and either for hand or foot operation.

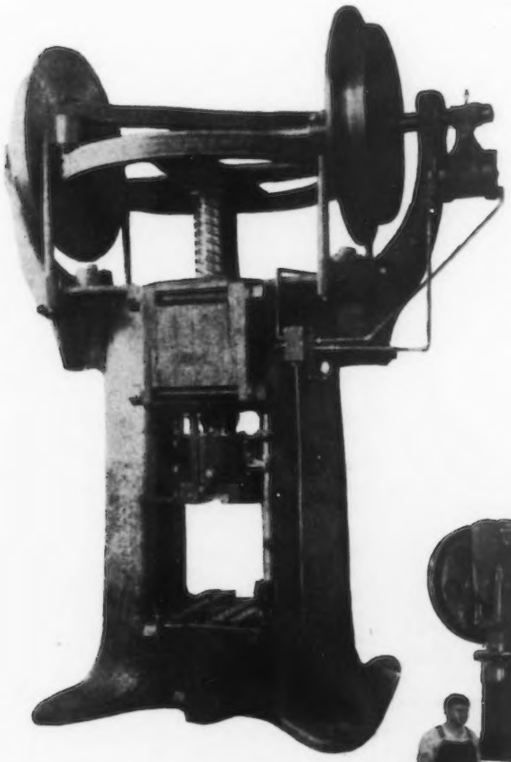


The side members of the press are made of steel plates. The end of the ram is provided with a hole and set screws so that punches or assembling tools can be secured to ram. Tools can also be bolted to the table by use of the T-slot. Adjustments of the ram are made by U-washers of suitable thickness. These presses are operated by the Hopkins tubular-type air cylinder, and on all presses the size of the cylinder can be changed to increase or decrease the pressure.

Percussion Power Press of Unusual Dimensions

WEIGHING 50 tons, the percussion power press illustrated is the heaviest so far built by the Zeh & Hahnemann Co., 182 Vanderpool Street, Newark, N. J.

The machine requires 50 hp. for operation, and although rated as exerting pressure of 625 tons, it is said to have developed, under test, a maximum of 1800 tons. It has a stroke of 22½ in. and operates at the rate of 10 strokes a minute. The overall height of this press, designated as the No. 25, is 18½ ft.



THIS Press, for Producing Hot Pressed Brass and Other Parts, Exerts Pressure In Excess of 625 Tons. Pneumatic control facilitates operation

Although used to produce hot pressed brass parts, the machine is adapted for embossing work and for hot or cold pressing of steel parts. Presses of this design produce a steel forging at one blow, and are said to be especially serviceable for upset parts.

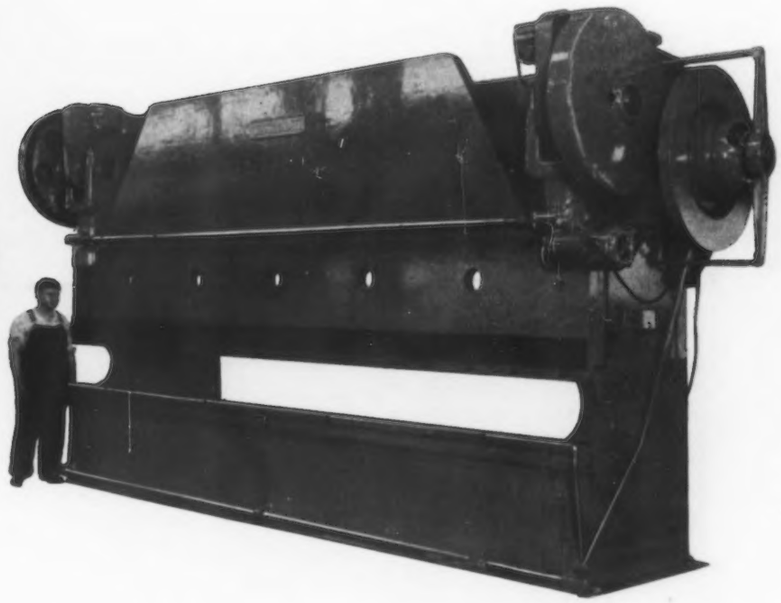
The frame is a steel casting and the 14-in. diameter main screw is made of tool steel and heat treated. The machine is provided with pneumatic control, and is convenient to operate. It reverses automatically at the end of the down stroke and stops at the up position. Slide and bottom knockouts are provided to eject the finished pieces quickly from the dies.

Press Brake with 16-Ft. Overall Die Surface

WITH overall die surface of 16 ft. and measuring 14 ft. 6 in. between housings, the press brake illustrated is of unusual length. The machine has capacity to form, without overload, right angles in 3/16-in. steel, 16-ft. long, over 1½-in. die to a 3/16-in. inside radius.

All the main members of this brake, which was built by the Cincinnati Shaper Co., Cincinnati, are made of rolled steel plate. The design incorporates two noteworthy features: First, cylindrical or spherical bearings throughout between load-carrying members, particularly the saddle to the ram and the mounting of the bed to the housings. This construction is emphasized as eliminating all sharp corners as a source of weakness and as permitting unrestrained action of every member. The second feature is that all loads are transmitted directly up the center line of both housings, eliminating distortion from eccentric loads.

THIS Press Brake, (Below) of Unusual Length, Has Capacity to Form Right Angles in 3/16-In. Steel, 16 Ft. Long, Over a 1½-In. Die to 3/16-In. Inside Radius



The adjustment to the ram is motorized; the drive to the flywheel is through multiple-V belt; all bearings are either anti-friction or bronze bushed; ram guides are gibbed in both directions and lubrication is automatic.

Copper Welding Rod

A NEW alloy called Phos-Copper for use as a welding and brazing material for copper and high copper alloys has been developed by Westinghouse Electric & Mfg. Co., and is marketed in rod and strip form. It is composed essentially of copper and from 5 to 10 per cent phosphorus, the rod form containing more phosphorus than the strip.

Phos-Copper begins to melt at approximately 700 deg. C. and becomes extremely fluid at 750 deg. C. for the rod and 800 deg. C. for the strip. The fluidity of the material is thus directly proportional to the phosphorus content, and the higher the fluidity the better will be the alloying, penetrating and cementing properties at a comparatively low welding or fusing temperature. Phosphorus partially burns out during welding and also prevents oxidation of copper at the surfaces being joined, thereby acting as a flux.

The alloy in rod form is comparatively brittle, but the chemical change that takes place during welding makes the deposit in the joint tough and ductile. In strip form, the alloy is soft and sufficiently ductile to be slit to any desired length and will form punchings down to a radius of 0.064 in. The latter are often desirable wherever pipe and coil connections can be made by using Phos-Copper punchings of the proper diameter.

The tensile strength of the deposit or joint varies from 18,000 to 30,000 lb. per sq. in., but the ductility is less than that of copper.

Nearly 55,000,000 Tons of Ingots in 1929

PRODUCTION of steel ingots in the United States in 1929 is reported by the American Iron and Steel Institute at 54,850,433 gross tons. This was a new high record, exceeding the 50,325,393 tons of 1928 by 9 per cent. Output of steel castings, at 1,583,040 tons, exceeded 1928 by 30 per cent and bettered the previous record, made in 1923, by 8.6 per cent. Total steel production was 56,433,473 tons, a gain of 9.5 per cent on the 1928 total, which was the previous high.

Basic open-hearth steel accounted for 46,644,206 tons of ingots, beating the old record—that of 1928—by 9 per cent. Bessemer steel, at 7,093,246 tons of ingots, was the largest since 1923, but was less than two-thirds the great tonnage of 1916. It exceeded 1928 by 7.6 per cent.

Electric steel ingots made a new high record, at 532,392 tons, displacing the 1928 record by 17.3 per cent. Acid open-hearth ingots showed a sharp recovery from the relatively low figure of 1928, reaching 576,393 tons, the largest since 1923, but less than half the tonnage made in 1916, 1917 or 1918. Crucible steel output, at 4196 tons, was the lowest for many years, showing a drop of 35.6 per cent from 1928 and being less than one-tenth the output of 1923.

The record in steel castings was accounted for wholly by electric steel castings, as the tonnage of basic open-hearth castings was slightly less than that of 1916, the acid open-hearth tonnage was less than that of 1923 or of 1916, 1917, or 1918, and the total open-hearth tonnage was less than that of those same four years. In electric castings, however, at 419,039 tons, a gain was made on the previous record—that of 1928—of 20.2 per cent.

Compared with 1928, basic open-hearth castings showed a gain of 54 per cent, acid open-hearth castings a gain of 18.6 per cent, total open-hearth castings a gain of 34.7 per cent, Bessemer castings a gain of 8.4 per cent, and crucible steel castings a loss of 29.6 per cent. The tonnage of crucible castings was, with the exception of that of 1921, the smallest for the twentieth century to date.

Included in the basic open-hearth steel ingots and castings was a total of 2,961,292 tons of duplex steel. This was made from metal partly purified in Bessemer converters and finished in basic open-hearth furnaces. While this figure was by no means a record, having been exceeded in 1916, 1917, 1918 and 1920, it was the highest total since 1920 and showed a gain over 1928 of 32.66 per cent. It represents 6.27 per cent of the total tonnage of basic open-hearth steel made.

PRODUCTION OF ALLOY STEEL INGOTS AND CASTINGS

Years	Ingots	Castings	Total	Years	Ingots	Castings	Total
1916....	1,306,157	56,458	1,362,615	1923....	2,014,269	92,220	2,106,489
1917....	1,576,866	67,529	1,644,395	1924....	1,940,461	85,948	2,026,409
1918....	1,721,367	66,485	1,787,852	1925....	2,320,390	112,583	2,432,973
1919....	1,435,816	45,372	1,481,188	1926....	2,317,313	146,101	2,463,414
1920....	1,591,939	68,353	1,660,292	1927....	2,385,904	145,844	2,531,748
1921....	769,293	40,255	809,548	1928....	3,045,225	169,684	3,214,909
1922....	1,614,392	59,104	1,673,496	1929....	3,764,287	192,920	3,957,207

PRODUCTION OF ALLOY STEEL INGOTS AND CASTINGS BY PROCESSES, GROSS TONS, 1928-1929

Processes	1929—Gross Tons			Total, 1928
	Ingots	Castings	Total	
Open-hearth steel—basic	3,198,079	42,451	3,240,530	2,869,822
Open-hearth steel—acid	57,833	50,174	108,007	102,682
Bessemer steel	90,089	6,223	96,312	66,018
Crucible steel	2,323	5	2,328	2,290
Electric steel	415,963	94,067	510,030	433,096
Total.....Gross tons	3,764,287	192,920	3,957,207	3,214,909

PRODUCTION OF DUPLEX STEEL INGOTS AND CASTINGS

Years	Gross Tons	Years	Gross Tons	Years	Gross Tons
1915.....	1,781,491	1920.....	3,279,119	1925.....	2,797,318
1916.....	3,436,457	1921.....	840,251	1926.....	2,815,980
1917.....	3,791,830	1922.....	1,651,089	1927.....	2,184,674
1918.....	3,870,017	1923.....	2,919,286	1928.....	2,232,197
1919.....	2,819,785	1924.....	2,131,856	1929.....	2,961,292

PRODUCTION OF STEEL INGOTS AND CASTINGS BY PROCESSES

Years	Open-Hearth			Bessemer	Crucible	Electric	Miscellaneous	Total Gross Tons
	Basic	Acid	Total					
1920.....	31,375,723	1,296,172	32,671,895	8,883,087	72,265	502,152	3,535	42,132,934
1921.....	15,082,564	507,238	15,589,802	4,015,938	7,613	169,499	945	19,783,797
1922.....	28,387,171	921,812	29,308,983	5,919,298	28,606	346,039	....	35,602,926
1923.....	34,665,021	1,234,636	35,899,657	8,484,088	44,079	515,872	....	44,943,696
1924.....	30,719,523	857,827	31,577,350	5,899,590	22,473	432,526	....	37,931,939
1925.....	37,087,342	947,146	38,034,488	6,723,962	19,562	615,512	....	45,393,524
1926.....	39,653,315	1,038,664	40,691,979	6,934,568	15,493	651,723	....	48,293,763
1927.....	37,144,268	924,067	38,068,335	6,191,727	9,036	666,087	....	44,935,185
1928.....	43,200,483	913,473	44,113,956	6,620,195	7,769	802,260	....	51,544,180
1929.....	47,232,419	1,120,469	48,352,888	7,124,075	5,079	951,431	....	56,433,473

PRODUCTION OF STEEL INGOTS

1920.....	30,926,393	759,102	31,685,495	8,778,107	70,536	346,956	298	40,881,392
1921.....	14,864,607	290,750	15,155,357	3,977,129	6,877	84,404	317	19,224,084
1922.....	27,961,190	517,045	28,478,235	5,871,565	27,561	191,057	....	34,568,418
1923.....	34,093,711	653,337	34,747,048	8,416,576	42,127	279,914	....	43,485,665
1924.....	30,263,005	454,926	30,717,931	5,846,153	21,096	225,977	....	36,811,157
1925.....	36,632,060	484,843	37,116,903	6,670,128	17,729	335,978	....	44,140,738
1926.....	39,172,688	533,285	39,705,973	6,891,502	13,452	325,278	....	46,936,205
1927.....	36,750,387	493,653	37,244,040	6,153,703	7,696	371,278	....	43,776,717
1928.....	42,818,557	454,883	43,273,440	6,591,745	6,516	453,692	....	50,325,393
1929.....	46,644,206	576,393	47,220,599	7,093,246	4,196	532,392	....	54,850,433

PRODUCTION OF STEEL CASTINGS

1920.....	449,330	537,070	986,400	104,980	1,729	155,196	3,237	1,251,542
1921.....	217,957	216,488	434,445	38,809	736	85,095	628	559,713
1922.....	425,981	404,767	830,748	47,733	1,045	154,982	....	1,034,508
1923.....	571,310	581,299	1,152,609	67,512	1,952	235,958	....	1,458,031
1924.....	456,518	402,901	859,419	53,437	1,377	206,549	....	1,120,782
1925.....	455,282	462,303	917,585	53,834	1,833	279,534	....	1,252,786
1926.....	480,627	505,379	986,006	43,066	2,041	326,445	....	1,357,558
1927.....	393,881	430,414	824,295	38,024	1,340	294,809	....	1,158,468
1928.....	381,926	458,590	840,516	28,450	1,253	348,568	....	1,218,787
1929.....	588,213	544,076	1,132,289	30,829	883	419,039	....	1,583,040

Little Chance of Better Prices for Some Time

BY LEWIS H. HANEY

Director, New York University Bureau of Business Research

BRADSTREET'S index of commodity prices declined during May by 1½ per cent, the decline occurring chiefly in textiles, metals, provisions and hides and leather. As of June 1, the index was 7.7 per cent lower than at the beginning of 1930, 13.4 per cent below a year ago, and nearly down to the low point in the middle of 1921. Multiplying the index by four gives $43.08, and experience indicates that this is the level *toward* which THE IRON AGE index of finished steel prices is *tending*.

During May the latter index averaged 2.221c. a pound against 2.258c. in the preceding month. Equivalent to $49.73 a ton, this appears to be about $6 a ton above its average relationship with the Bradstreet index of commodity prices. As long as the Bradstreet index continues to decline, and business in general remains so dull, any sustained general recovery in steel markets is highly improbable.

What, then, are the chances of a rise in the general price level? That prices will begin a sustained upward movement in the near future does not seem probable. The reasons for this conclusion are found partly in the action of commodity markets themselves and partly in economic analysis.

Prices Still Moving Downward

There is yet no indication that the downward trend of prices has ceased. Commodities showing declines each week outnumber those showing advances, and the weekly price indexes are making new lows. The trend of the P-V line, which is a general price barometer, is still downward. "Sensitive" price indexes, based on small groups of commodities which usually anticipate the general trend, also point downward.

It can hardly be said that over-production, in most cases where it has prevailed, has been corrected sufficiently to give rise to commodity shortages. The latest available data concerning stocks of manufactured commodities in producers' hands show these considerably larger than a year ago.

Composite indexes of production are somewhat in excess of their average relationship with railroad freight shipments, due allowance being made for long-time trends. Instead of gratification over the sustained levels of the production curves, we probably should feel misgivings, on the ground that *the only way to balance supply and demand at present price levels is to curtail production.*

On the side of credit, there has been no such rising trend in bank deposits as to indicate a general rise in prices. Anyhow, deposits and bank credit in general are in an abnormal position as a result of the late stock market crash and the present extended condition of collateral loans.

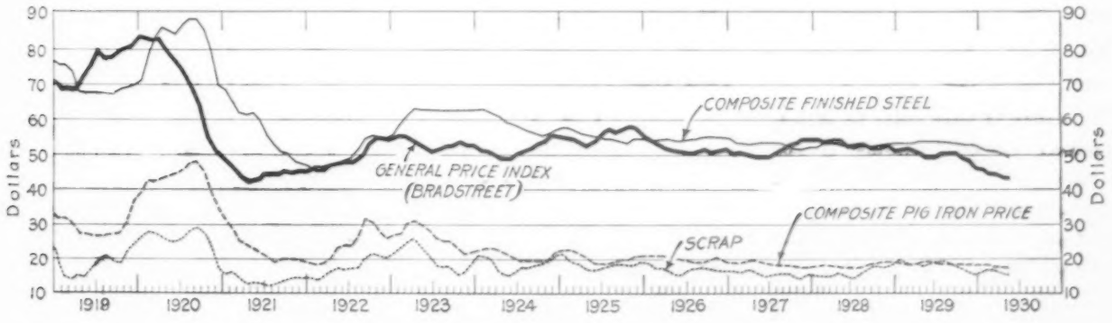
Probably the most hopeful aspect of the price situation is found in the prevailing smallness of dealer stocks of most commodities. This is likely to lead to active buying when the trend of prices changes—but not until then.

Steel Situation Is Spotty

The notable fact concerning steel prices is the irregular and spotty condition of steel-making operations. The industry now appears to be chiefly dependent upon a few kinds of steel products, such as line pipe. Not all companies are in position to participate in such business, and some find their order books very low. This situation makes for keen competition and an unstable price structure.

Pig iron can no longer be said to be relatively cheap when compared with finished steel or with steel scrap. Certain grades of pig iron (such as basic) do not seem to have responded as yet to the decline in steel scrap. Coal and coke markets are very dull and weak. Pig iron usually shows some seasonal weakness in July or August.

As to scrap, it cannot be said that the downward trend has been definitely checked in spite of the rally in heavy melting material at Pittsburgh last week. At most other points, weakness is still reported. It may well be doubted if the May average price, $15.25, will prove to be the year's low.



Weakness in Prices Persists and May Be Expected to Continue for Some Time. Steel remains too far above general commodities to maintain its present position

This Issue in Brief

Baby incubators, mayonnaise mixers, fish-preserving units, motion picture film developers, all use corrosion-resisting alloy steel. New uses are being found daily for chrome-nickel alloys.—Page 1735.

* * *

Success in selling to Japan depends largely upon proper marketing. If the market in Japan is large, opening a branch office deserves serious consideration. For Japanese are more inclined to give business to foreign representatives in Japan, rather than to their own people.—Page 1740.

* * *

Improved brass founding practice results from study of internal structure of metal revealed by deep etching or pickling in nitric acid.—Page 1745.

* * *

Engineering graduates given a year of general training by Westinghouse company to fit them for minor executive positions—Page 1741.

* * *

Ability of wire cable to absorb shocks varies according to the compactness with which it is stranded. Bridge cables must be pre-stressed to be converted into an elastic unit.—Page 1748.

Automatic combustion control and tight furnaces mean quick heats and low steel-making costs. Two such plants now operating at practical capacity.—Page 1759.

* * *

Rustless steel hub caps cost little more than plated steel because the plating operation is avoided. "18 and 8" easier to draw, polish and buff than the plain chromium alloy.—Page 1755.

* * *

Fifty-year old Calumet blast furnace replaced by another of same nominal dimensions but of 600-ton instead of 250-ton daily output.—Page 1750.

* * *

Seamless tubes of indefinite length made by Viennese scientist, by electroplating iron on a slightly conical mandrel, and withdrawing the tube as fast as it forms.—Page 1753.

* * *

Steel and pig iron prices face further decline, if they are to come into line with general commodities, Dr. Haney thinks.—Page 1765.

* * *

Corrosion-resistant alloy sheet is competing with many other materials in the manufacture of special equipment.—Page 1736.

Scrap brass castings and chips remelted in 22-in. cupola, using a prepared hard fuel, and cast into molds with a metal recovery of 95 per cent or more.—Page 1747.

* * *

Recruiting engineering and executive staff for Westinghouse Electric & Mfg. Co. has required the establishment of a training school for 400 men yearly.—Page 1744.

* * *

Rare metals, germanium and indium, recently prepared from by-products of commercial processes, have unusual resistance to severe corrosion.—Page 1752.

* * *

Ladle skulls, a source of waste and trouble to brass foundrymen, controlled by using linings which soften slightly at temperature of molten metal.—Page 1746.

* * *

Sulphur is not absorbed by steel in the open-hearth if coal contains less than 1 per cent, or if tar contains less than 0.6 per cent.—Page 1759.

* * *

Automatic buffing machines—rotating multiple fixtures and wheels at various angles—needed to polish 6,000,000 hub caps a day.—Page 1756.

Business to Turn Upward in August

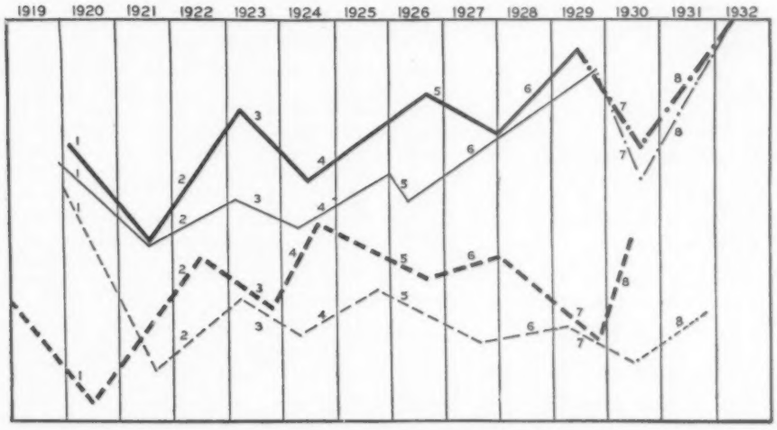
Cyclical Change Likely to Come This Summer, Says Alvan T. Simonds, But It May Be Delayed Until January

"IN July we may be reasonably expecting soon to see the rosy tints of the coming day with its increased activity," says Alvan T. Simonds, president, Simonds Saw & Steel Co., Fitchburg Mass., in *Looking Ahead.* "July and December are, except in years of revival from depression, the two dark periods, the two low points of the industrial year. July is usually darker than the following December, but we do not anticipate that in 1930 it will be much gloomier than was December last.

"The chart shows the short cyclical movements in money rates, in industrial production, in wholesale commodity prices, and in industrial stock prices. First there is a downward movement in each of these four business factors. Each of these first downward movements is numbered 1. This is followed by an upward movement of each of the four factors. These are numbered 2. Similarly notice sets 3, 4, 5, 6 and 7. Industrial production (or business activity) is now in movement number 7. Money rates are in movement number 8, forecasting a new set. The heavy dotted line numbered 8 is the actual movement of money rates, reversed, up to date. On the chart, we show also our estimated movements for the other three factors in this new set. The lines indicating these estimates are broken by dots and are numbered 8.

"Notice that money rates regularly move first in each set. This gives the forecast. In 1926 stock prices started up in set number 6 before money rates turned up. This is the single exception. The upward movement of stock prices from the spring of 1924 to the spring of 1929 is really one major swing and should not be broken into three.

"The forecasting line, money rates reversed, forecasts only the direction of the trend and the approximate length of the other three factors. To determine just when the peak or the low point is to occur, we must look to short-time forecasters. Notice, however, that each peak since the war has come at the time of a seasonal peak, i.e., in the spring or the fall, and each low point at the time of a seasonal low point, i.e., in midsummer or December. It seems therefore very likely that in August business will be on the cyclical upgrade; but unexpectedly poor second quarter reports of earnings or a serious political disturbance in the fall might bring the cyclical low point into December."



THE Heavy Dotted Line Is Commercial Paper Rates, New York, Reversed. This shows the swings in credit supply. It is the forecaster, preceding the other business factors in their cyclical fluctuations. The heavy solid line is the volume of industrial production, Federal Reserve Bulletin. The light dotted line is wholesale commodity prices, Guaranty Survey. The light solid line is industrial stock prices, Annalist. Estimated movements are indicated by breaking the lines with dots and are numbered 8. The forecasting line, money rates reversed, forecasts only the direction of the trend and the approximate length of the other lines. The lines on the chart are comparable only for direction and duration of trend. They represent the short cyclical swings by straight lines connecting cyclical peaks and cyclical low points. Minor fluctuations are omitted.

Phillips Petroleum Co.'s Pipe Order 50,000 Tons

Supplementing the announcement in THE IRON AGE, May 29, of an award by Phillips Petroleum Co. for steel pipe, the Republic Steel Corporation, which secured the order, states that its contract covers 800 miles or 50,000 tons of 8-in. electric welded steel pipe, to cost nearly $3,000,000. This is the first large order to be taken by the Republic corporation for its new electric welded pipe mill, which will be placed in operation this month. Shipments will start in July and will cover a period of about 10 weeks. The line will be used to transport gasoline from Texas to Wichita, Kansas City, St. Louis and intermediate points, and it is stated that it will be the largest pipe line ever laid for this purpose.

Pig Iron Freight Rates in New England Changed

WASHINGTON, June 10.—Rates on pig iron from the blast furnace of the Mystic Iron Works, Everett, Mass., will be both increased and decreased, effective Aug. 25. A decision of the Interstate Commerce Commission made public last Saturday sets up a distance scale to adjust the rates to destinations in Massachusetts, Rhode Island, Connecticut, Maine, New Hampshire, and Vermont.

The most important market for pig iron in New England is in Connecticut, according to the decision. Under the scale, single line rates from Everett to Hartford, Conn., will be $2.45 a gross ton, a cut of 45c. from the prevailing rate of $2.90. To Waterbury and Bridgeport, Conn., the single line rates will be $2.65, a reduction of 55c. from the existing rate of $3.20. The scale provides a differential of 20c. a ton for joint hauls. To the Connecticut points mentioned a switching charge of $5 a car is made. Everett, in the Boston switching district, is served by the Boston & Albany and the Boston & Maine and by boat through the Boston harbor. A switching charge of $10 a car is assessed at Boston on shipments to points on the New York, New Haven & Hartford, $5 of which is absorbed by the New Haven when moving to non-competitive points. The commission said approximately 20 per cent of the Mystic furnace output moves by water to Baltimore, Philadelphia, Brooklyn and Jersey City.

Destinations in New England are grouped for the purpose of making rates from Port Henry, Buffalo, and Beacon, N. Y., and Hokendauqua, Pa. A rate of $3.65 applies from Port Henry and Hokendauqua for distances ranging from 212 to 448 miles. From Buffalo the rate is $4.91 for distances ranging from 397 to 620 miles. The barge-rail rate from Buffalo to destinations on the New Haven road is $3.78.

The following table gives examples of the rate changes:

Rates per Gross Ton on Pig Iron From Everett, Mass.

To	*Effective Aug. 25	Present
Milford, Mass.....	$1.85	$1.64
Providence, R. I....	1.85	2.00
Manchester, N. H...	2.05	1.89
Dover, N. H.....	2.05	2.02
Portland, Me.....	2.45	2.39
Westfield, Mass.....	2.45	2.39
Hartford, Conn.....	2.45†	2.90†
Claremont, N. H....	2.45	2.52
Waterbury, Conn...	2.65†	3.20†
Bridgeport, Conn...	2.65†	3.20†
Rutland, Vt.....	2.85	2.65

*Single line hauls. Joint line hauls, 20c. per ton higher.
†Plus $5 switching charge.

Planning Reduces Unit Costs

Hand-to-Mouth Buying Adds Complications—Too Much Can Be Spent on Refinements

THAT total unit costs are reduced wherever good planning is employed was emphasized by W. S. Richardson, staff superintendent, mechanical division, B. F. Goodrich Rubber Co., Akron, Ohio, in an address before the production conference of the American Management Association at the Hotel Statler, Cleveland, June 9.

"Savings in total unit costs as a result of planning are more by far than the increased cost of overhead represented by the planning department, or the increased costs of overhead believed to exist as a consequence of hand-to-mouth buying," he said.

"Hand-to-mouth buying has forced us to think of planning in two mediums, 'line planning' and 'staff planning,' representing planning after and before the order has been received, respectively," Mr. Richardson continued.

"The evils charged to hand-to-mouth buying are: First, it gives the overhead organization more orders to handle for a given quantity of business; secondly, the required quick delivery time affects the rate of production. Unless the management thinks its way carefully through this situation it is faced with the cost of changing the rate of production frequently, with the attendant taking on and laying off of labor as the rate of buying surges up and down. This is particularly true of industries manufacturing exclusively on a job order basis. The third charge is that the rapid changes in the rate of production reflect themselves in commodity buying and force purchases at unfavorable times."

Mr. Richardson went on to explain how the B. F. Goodrich Rubber Co. has faced these three problems so far as planning is concerned.

How Problems Arising from Hand-to-Mouth Buying Were Met

The demand for quick information and delivery of product focused attention upon the handling of orders. It was found that there was a great deal of unnecessary delay, overlapping, and clerical work in the handling of an order, due to varying systems in the branch offices and in the sales, shipping and billing departments. The system was not only costly but extremely slow with regard to procuring information. The result was the creation of a centralized service department under staff control which was given considerable authority and broad functions, department barriers being surmounted in one jump.

"Today," Mr. Richardson said, "there is a consolidated department of 107 people handling 15 per cent more orders than were handled previously by 171 people. Service to customers and to branches is much improved, not only in speed but in accuracy.

"The second problem presented by hand-to-mouth buying, namely, rapid changes in the rate of production, was met by taking some of the savings made by organizing the service department and setting up a separate group known as the production control department. This consists of five people to do staff planning work, line planning being handled by the service department.

"Specifically," Mr. Richardson continued, "the job of the production control department is to establish the rate of production within the various production departments and to notify the service department of the required rate. It has sole responsibility for raising and lowering this rate, the objective being to keep the production rate as uniform as possible, and in any event have the production curve rise slowly and fall slowly.

"In addition to the production control department," Mr. Richardson said, "we have a raw materials planning division the duty of which is to take the forecasts of the production control and turn them into terms of raw material and to release to the purchasing department such quantities as are consistent with the forecasted rate of production. This division has full responsibility for the size of the raw materials inventory.

Planning Methods Can Be Too Refined

"I think that too much money can be spent in the planning department by refining methods too closely. After all, our object is to provide a steady flow of work to the employee of the desired kind represented in our expressed obligations to our customers, and to see that this is performed efficiently. I feel that sometimes management ties too many 'do-dads' to its coat tails which careful investigation will prove cannot justify their costs."

Inventor of Self-Tapping Screws Honored

At the medal meeting of the Franklin Institute in Philadelphia May 21, Heyman Rosenberg, vice-president Parker-Kalon Corporation, New York, was awarded the institute's Certificate of Merit for his development of the Parker-Kalon hardened self-tapping screws, used in the fabrication of metal products.

Heyman Rosenberg

Mr. Rosenberg's first development was a self-tapping screw for fastening pieces of light gage sheet metal, which, as its name implies, is capable of cutting a thread as it is screwed into the metal, much as a tap cuts a thread in iron or steel of thicker section. Later Mr. Rosenberg turned his attention to making similar fastenings for heavier sections of material such as iron, brass and aluminum castings, steel, Bakelite, developing what is known as a hardened metallic drive screw. This screw has a spiral form of thread and when hammered or otherwise driven in, it cuts a corresponding female thread in the material.

The original sheet metal screw was suitable only for the light gages of sheet metal, and the hardened metallic drive screw could be used only as a permanent fastening, once driven in it could not be readily removed. This led to the development of an improved form of the self-tapping sheet metal screw which could be used on heavy gages of sheet metal and solid sections and can be removed and reinserted when necessary. This was followed, in turn, by the "Screwnail," which combines the driving qualities of a nail and holding qualities of a screw, and is designed to give a more secure means of fastening sheet metal to wood.

Gear Association Sets Date for Fall Meeting

The semi-annual meeting of the American Gear Manufacturers Association will be held at the Hotel Clifton, Niagara Falls, Ont., Sept. 29, 30 and Oct. 1.

Other action of the executive committee at its recent meeting includes selection of A. A. Ross, engineer, General Electric Co., West Lynn, Mass., to succeed B. F. Waterman, engineer, Brown & Sharpe Mfg. Co. and president of the association, as chairman of the associations general standardization committee. This committee heads the activities of several technical sub-committees, the work of which has been reported in THE IRON AGE for several years in connection with the spring and fall meetings of the association. Mr. Ross has been actively identified with the association's technical standardization work, particularly that relating to herringbone gears.

▲▲▲ PERSONALS ▲▲▲

H. W. RINEARSON, vice-president and general manager of the Armco Culvert Manufacturers' Association, has resigned his position to become vice-president in charge of distribution for the A. M. Byers Co., Pittsburgh, and he is being succeeded by S. R. IVES, general manager of the Lyle Culvert & Pipe Co., Minneapolis, Minn.

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J. S. LANGSTON has been appointed manager of the Witherow die rolling division of the Republic Steel Corporation, Youngstown, and will handle the sale and development of die-rolled products. He was formerly general sales manager of the Witherow Steel Corporation. FLOYD SMITH, former president of the Donner Steel Co., will act for the Republic corporation in a special executive capacity, assisting in the administration of its affairs in the Buffalo district.

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A. H. CHAPPELKE has resigned as vice-president of the Lake City Malleable Co., Cleveland, with which he has been connected for several years. He was formerly vice-president of the Chisholm-Moore Mfg. Co., Cleveland.

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JAMES A. CAMPBELL, chairman of the Youngstown Sheet & Tube Co., Youngstown, has been confined in the North Side branch of the Youngstown hospital, suffering from an infection of the arm. His condition is reported improved.

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FRANK BAACKES, assistant to the president, American Steel & Wire Co., is at the Illinois Central Hospital, Chicago, as a result of injuries from a fall while on a visit to his summer home at Sayner, Wis.

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FLOYD B. HOBART, formerly chemical engineer in plant experimental and standardization work with the Atlantic Refining Co., has joined the staff of the Battelle Memorial Institute, Columbus, Ohio, as fuel chemist. With R. A. SHERMAN, fuel engineer, and CLYDE E. WILLIAMS, assistant director, this group will form the nucleus of an organization within the institute devoted to research problems in fuels.

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HORACE ARMSTRONG, sales manager, Armstrong Brothers Tool Co., Chicago, has sailed for Europe on an extended business trip on which he plans to visit 12 countries.

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CARL H. MORKEN, formerly plant metallurgist with the Ohio Brass Co., has resigned his position to become foundry engineer of the Detroit Electric Furnace Co., Detroit. He will be connected with the sales and service division of the company.

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THOMPSON A. LYON, for the past 10 years superintendent of the Davis & Hemphill Co., has been appointed plant superintendent of the Alexander Milburn Co., Baltimore.

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W. W. CHACE has opened an office at 181 Eddy Street, Providence, R. I., for the distribution throughout Rhode Island and Connecticut of lubricating equipment manufactured by the Blanchard Lubrication division of the Rivett Lathe & Grinder Corporation, Boston.

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ERNEST J. OPIE has been appointed general superintendent of the Girard Model Works, Inc., Girard, Pa.

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WILLIAM E. BALLIET has been made manager of the Birmingham office of the Blaw-Knox Co., Pittsburgh, succeeding P. V. KELLY, and JOSEPH RILEY will become assistant manager of the district.

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HAYDEN B. RUSSELL has been appointed sales representative of the Modern Tool Works division of the Consolidated Machine Tool Corporation of America, in the metropolitan district, with headquarters at 150 Broadway, New York. He was formerly associated with the Carboloy Co. and the Speakman Co. in similar capacities.

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ARTHUR SCHAEFFER has been appointed Detroit district sales manager of the Republic Steel Corporation. He was formerly sales manager in Detroit for the Central Alloy Steel Corporation. W. J. HANNA, formerly manager of sales of the Republic Iron & Steel Co. in Detroit, will be assistant district sales manager in that city.

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WARNER SEELY, secretary, Warner & Swasey Co., Cleveland, has been elected president of the Cleveland Engineering Society for the ensuing year and has been reelected to the board of trustees. He served as vice-president of the society during the past year. ORRIN C. SABIN, Sabin Machine Co., was elected vice-president of the society, and HUGH COOK, treasurer. CARLTON R. SABIN was reelected secretary-manager.

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R. M. SMITH, of the Rockford Screw Products Co., Rockford, Ill., has been reelected president of the Rockford chapter of the American Society for Steel Treating. CHARLES COTTA, Cotta Gear Works, was made vice-president and O. T. MUEHLEMEYER, O. T. Muehlemeyer Hardening & Heat Treating Co., was renamed secretary-treasurer.

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W. L. LEWIS, formerly assistant comptroller of the Bethlehem Steel Corporation, has been elected vice-president, secretary and treasurer of the Chicago Pneumatic Tool Co., succeeding J. G. GRIMSHAW, who has resigned.

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J. H. MORRISON, vice-president in charge of sales, Warren Foundry & Pipe Co., New York, WILLIAM H. SHAFFER, manager of dealers' sales National Steel Fabric Co., Pittsburgh, and H. D. BEATON, eastern manager, Fabric Steel Corporation, New York, were among 13 passengers of an airplane which fell into Boston harbor on June 5, when about to proceed to New York. All three executives were cut, but not seriously injured.

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MORRIS METCALF, vice-president, Bosch Magneto Corporation, Springfield, Mass., has been elected president of the Radio Manufacturers' Association. Mr. Metcalf was president of the International Steel Corporation, the steel export subsidiary of the American International Corporation, just prior to its liquidation some years ago.

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A. J. GERLACH, of the National Equipment Corporation, was elected president of the Milwaukee Association of Industrial Advertisers at the annual meeting on June 5. He succeeds FORREST U. WEBSTER, of Cutler-Hammer, Inc. R. A. SHILBAUER, Chain Belt Co., was elected vice-president, and L. P. NIESSEN, of Cutler-Hammer, Inc., secretary-treasurer.

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JAMES J. DALY, formerly traffic manager for the Donner Steel Co., has been appointed assistant general traffic manager for the Republic Steel Corporation, Youngstown.

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R. F. HARRINGTON, metallurgist, Hunt-Spiller Mfg. Cororation, Boston, addressed the New England Foundrymen's Association at its June meeting in Boston on June 11. Sand control, conservation and reclamation in the production of quality castings were discussed by Mr. Harrington.

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J. L. SANDBORN, vice-president and general manager, Roller-Smith Co., Bethlehem, Pa., was the guest of the New Britain Electrical Club and the local branch of the American Society of Mechanical Engineers at New Britain, Conn., on June 6. Mr. Sandborn discussed methods of designing and manufacturing electrical measuring instruments and circuit breakers.

OBITUARY

GEORGE EDWIN MERRYWEATHER, president, Motch & Merryweather Machinery Co., Cleveland, machinery dealer, and long prominently identified with the machine tool industry, died suddenly June 8 at his home at Gates Mills, a Cleveland suburb, of a heart attack. He was 57 years of age. He was born in Cincinnati and in 1896 was graduated from the Massachusetts Institute of Technology as a mechanical engineer. On leaving college he became identified with Brown & Sharpe Mfg. Co., remaining until 1901, and represented that company at the Paris Exposition. From 1901 to 1904 he was affiliated with the automotive industry as superintendent of the Overman Mfg. Co., Chicopee, Mass., and the Locomobile Co. of the same city, with which the former was merged. In 1904 he and Stanley Motch and E. R. Motch organized the Motch & Merryweather Machinery Co., Mr. Merryweather becoming president and remaining at the head of the company until his death. He played a conspicuous part in the World War as chief of the machine tool division of the War Industries Board, and was located in Washington for some time in connection with the purchase and allocation of machinery. He was one of the organizers and the first president of the Associated Machine Tool Dealers. He was a member of the American Society of Mechanical Engineers, Society of Automotive Engineers, as well as of other technical organizations and several Cleveland clubs.

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COKER F. CLARKSON, for the past 20 years secretary and general manager of the Society of Automotive Engineers, died of heart disease at his home at Scarborough-on-Hudson, N. Y., on June 4. He was born in Des Moines, Iowa, in 1870, and was graduated from Harvard College and Harvard Law School. He was admitted to the Philadelphia bar in 1896, later opening his own office and specializing in cases involving engineering questions and patent law. After becoming head of the engineering department of the Association of Licensed Automobile Manufacturers, operating under the Selden patents, Mr. Clarkson edited numerous bulletins and reports of tests dealing with the mechanical branch of the association's work. He became secretary and general manager of the S. A. E. in 1910. He was a member of the automotive products section of the War Industries Board during the war, and in 1917 he was secretary of the war truck committee of the Quartermaster's Department.

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EDWARD T. CHILD, for 20 years identified with the Southwark Foundry & Machine Co., Philadelphia, died in St. Luke's and Children's Homeopathic Hospital, Philadelphia, on June 9, after an illness of six weeks. He was 58 years old. Mr. Child was a graduate of the University of Pennsylvania, where he served for several years as assistant professor in the engineering department. He also had cooperated with pioneers in the electrical industry in building the old Duane Street generating station in New York.

George E. Merryweather

Coker F. Clarkson

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FRANK E. SATTERLEE, president, F. E. Satterlee Co., Minneapolis, Minn., machinery dealer, died on May 24.

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WILLIAM A. REID, well known industrialist of Racine, Wis., died June 4 at Rochester, Minn., following an operation. He was 55 years of age. Mr. Reid was chief engineer of the former Pierce Engine Co., Racine, becoming chief engineer of the automobile division of the J. I. Case Threshing Machine Co., when it acquired the Pierce company. Later he became a division superintendent of the Thomas B. Jeffery Co., Kenosha, Wis., which was purchased by Charles W. Nash in 1916. In recent years he was general superintendent of the Jacobson Mfg. Co., Racine, manufacturing power lawn mowers.

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OTTO P. KAMSCHULTE, president of the Otto P. Kamschulte Co., Milwaukee, manufacturer of special machinery, tools, jigs and equipment, died June 6, aged 55 years. He was connected with the Allis-Chalmers Mfg. Co. for many years, and at one time held rank as chief engineer in the United States Navy.

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ALBERT MENTALL, superintendent of cold-rolled strip department of the Sharon Steel Hoop Co., Sharon, Pa., died at his home at that city on June 8, aged 47 years. He organized the cold-rolled strip department for the Sharon company, and had been associated with the company for the past two years. Previously he had been identified with the American Steel & Wire Co. at the Cuyahoga works in Cleveland.

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JAMES P. GROOME, for 15 years identified with the Chicago office of Manning, Maxwell & Moore, Inc., died June 7, after an illness of many months.

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ROSWELL A. MOORE, manufacturer, Waterbury, Conn., died on June 1, in Paris, aged 64 years. He was formerly identified with the Waterbury Buckle Co., Waterbury, Conn., and succeeded Julius Maltby as head of that concern.

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WILLIAM E. NICKERSON, inventor and vice-president in charge of the mechanical department, Gillette Safety Razor Co., died at his home in Boston, June 5. He was born in Providence, Mass., in 1853, and was a graduate of Massachusetts Institute of Technology.

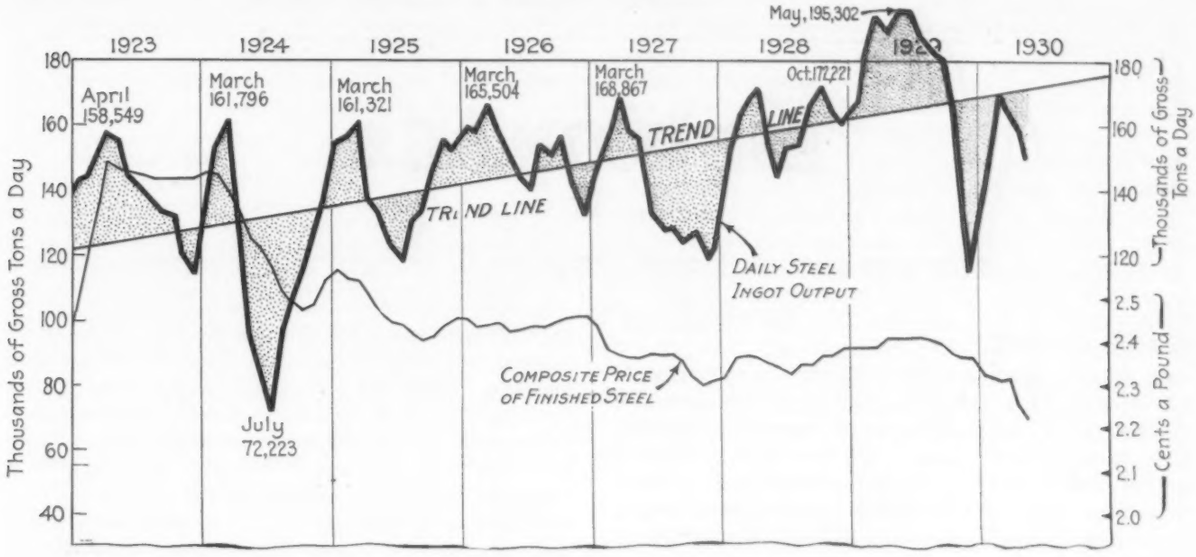
Fewer Locomotives Shipped by Makers in May

WASHINGTON, June 10. — Railroad locomotives to the number of 58 were shipped in May, against 97 in April, according to the Department of Commerce. Shipments during both months consisted of steam locomotives exclusively. All but two in May and three in April were for domestic use.

Unfilled orders at the end of May totaled 419 locomotives, of which 372 were steam and 47 were electric. Five steam and four electric units are for export.

In the first five months of 1930, shipments totaled 338 locomotives, against 241 for the corresponding period of last year. Ten steam units this year were exported. Only six electric locomotives were shipped, all for domestic use.

Ingot Output in May Dropped the Curve Still Further Below the Long-Time Trend Line. Prices in May continued the sharp drop of April



Ingot Output Declines Further in May

Daily Production 6.7 Per Cent Under April—Total for Five Months Was 15.7 Per Cent Below 1929—Annual Rate 48,500,000 Tons

PRODUCTION of steel ingots in the United States in May is calculated by the American Iron and Steel Institute at 4,024,778 gross tons. This is a loss of 129,072 tons (3.1 per cent) from the revised April figure and, as it was made in 27 working days in place of 26, the rate of reduction in the daily average is still greater. The daily output was 149,066 tons, compared with 159,764 tons in April, a drop of 6.7 per cent.

As the institute has completed its compilation of figures for 1929, the current figures are based on reports from companies which made 94.27 per cent of the total 1929 production. For more than a year the figures have been based on reports from companies which made 94.51 per cent of the 1928 production. The estimate affects the remaining 5.73 per cent for companies not reporting monthly.

While the May daily output is much lower than in either of the three preceding months, it is considerably larger than the figures for January, December and November, being almost 33,000 tons above the low point, reached in December. May shows a gain of 28.4 per cent on December.

For the first five months of the year production was 20,352,960 tons. This shows a recession of 15.7 per cent from the 24,133,741 tons made in the first five months of 1929, according to the adjusted figures. With the further exceptions of 1928 and 1926, the output in the first five months of 1930 was the largest ever reported for such a period. The total for five months was at a daily rate equivalent to over 48,500,000 tons for the year.

Bessemer tonnage showed an increase from April, in contrast with the drop in open-hearth tonnage. This increase was almost 4 per cent, whereas open-hearth ingots showed a loss of about that same ratio. The figures do not cover electric and crucible ingots, which no longer are collected monthly. In 1929 the production of these ingots was about 1725 tons each working day.

Curves of ingot production and of finished steel prices are carried in the diagram from the beginning of 1923. The table gives the monthly output of open-hearth and Bessemer steel ingots as reported by the institute for the past 17 months. Some revisions have been made by the institute, in addition to the adjustment of final figures for 1929.

PRODUCTION OF OPEN-HEARTH AND BESSEMER STEEL INGOTS
(Gross Tons)

Months	Reported by Companies Which Made 94.27 Per Cent of the Steel Ingots in 1929		Calculated Output of All Companies		No. of Working Days
	Open-Hearth	Bessemer	Monthly	Daily	
Total, 1928	40,538,657	6,591,217	49,865,185	160,338	311
1929					
January	3,692,062	549,616	4,500,209	166,674	27
February	3,590,826	489,279	4,328,789	180,366	24
March	4,180,408	596,691	5,068,265	194,933	26
April	4,025,409	640,351	4,950,139	190,390	26
May	4,275,161	707,484	5,286,339	195,790	27
5 months	19,763,866	2,983,421	24,133,741		130
June	3,999,363	622,585	4,903,657	196,146	25
July	3,922,053	649,950	4,850,668	186,564	26
August	3,987,400	668,023	4,939,172	182,932	27
September	3,624,954	642,886	4,527,966	181,119	25
October	3,631,674	642,235	4,534,405	167,941	27
November	2,796,214	522,672	3,521,173	135,430	26
December	2,375,797	360,489	2,903,063	116,123	25
Total, 1929	44,101,321	7,092,261	54,313,845	174,643	311
1930					
January	3,137,002	441,572	3,796,090	140,596	27
February	3,336,021	508,618	4,078,327	169,930	24
March	3,513,904	539,616	4,299,905	165,381	26
April	3,406,610	509,234	4,153,860	159,764	26
May	3,265,190	528,968	4,024,778	149,066	27
5 months	16,658,727	2,528,008	20,352,960	156,561	130

W. W. MACON
Editor

THE IRON AGE

A. I. FINDLEY
Editor Emeritus

ESTABLISHED 1855

Tariff Aspects

IF sound and fury were to decide, the bill that is either to be killed or made a law in the next few days is the most momentous tariff measure with which Congress has ever dealt. Yet the fact is that it makes fewer changes in duties and less striking ones than any of its predecessors in many years. Over and over we have been told that the uncertainty concerning its fate is largely responsible for the unfavorable aspects of current business. We believe there is much exaggeration in that view. On the one hand we are assured that the passage of the bill, stripped of the debenture folly and with flexibility properly safeguarded, will be a tonic to lagging business; while just as positive is the prediction that no tariff ever made will prove so disastrous to American trade abroad and at home.

Experience with other tariffs suggests that neither the friends nor the foes of the pending measure are right in their prophecies. Other influences figure so largely in the present state of industry that either side will find political alibis in plenty against the needs of the fall campaign, whatever the outcome of the vote in the Senate. We do not forget that in 1922 the country was put on notice that the increased rates of the Fordney-McCumber tariff would make the cost of living intolerably high. Yet commodity prices in the United States have been declining in the intervening years and their fall has not yet been arrested.

Moreover, if there is alarm over the protests other governments have been sending to Washington these many months, let it be recalled that thirty foreign nations were equally vehement against the Fordney-McCumber bill. Whereas they told us that its passage would play havoc with our commerce with them, and some of them threatened retaliation, nothing of the sort happened. Our export and import trade with these various countries increased after 1922 and in the past few years has been of unprecedented volume. American products are in demand abroad on the score of price and quality and of desirability otherwise. They will continue to sell abroad for the same reasons, and national sentiment will figure negligibly, as in the past. In like manner American importation of foreign products will continue on a large scale, in spite of the cry that has gone up, as it goes up on every tariff revision, that this country is rearing a high wall to shut out goods made abroad. Those who go on repeating that charge omit any reference to the fact that nearly 65 per cent of all imports enter the country duty free.

Every turn in the long welter of discussion has left the Hawley-Smoot bill with less likeness to the specification laid down in President Hoover's extra-session message. Since both political parties declared for protection in their platforms of 1928 and both were fairly emotional in promising aid to the farmer, there was good hope that the President's expectation of a "limited" revision, applying chiefly to agriculture, would be met. The outcome is a sorry nondescript, so compounded of compromise and inconsistencies as to make its passage as a party measure entirely out of the question. From the beginning the shaping of the bill has been such a continuous spectacle of prejudice and group maneuvering that no schedule could get fair consideration from the standpoint of its effect on national prosperity. In that aspect the whole performance discourages any hope of separating the tariff from political chicane.

Where can there be such hope when from a truthful Washington writer we learn that those who would thwart the President's plans may even order some of their number to become deserters and vote for the bill? And to what end? To reap advantage in November from an expected popular uprising against the new act. One day such juggling with principle and the national welfare would have been called shameful. In the present state of political morals it wears the euphemisms of "tactics" and "strategy."

Time for the Question Mark

NO tool of management is more useful to the industrial executive than the question mark. No time is more appropriate for its application than one such as at present, when a temporary lull in production gives the opportunity for self examination.

The question mark is a tool of universal usage. It can be applied to every department and every phase of industrial activity. Wastes and inferior methods cannot remain hidden under its searching power. It is a tool which does not depreciate through use, but becomes keener with repeated application.

There is plenty of room for the question mark even in the most ably managed plant; indeed, its constant use is an earmark of good management.

The executive question mark takes nothing for granted. The fact that a method or machine has been in use for a long time does not permit it to pass without interrogation. On the contrary, this arouses the suspicion that there may be something newer and better.

Starting with the design of the product and extending all through the successive steps of its making,

an intelligent analytical interrogation cannot fail to reveal possibilities of product betterment or cost reduction.

Here are a few questions which might be asked in the average plant, and for which good management should be able to supply positive answers:

Are we making adequate use of recent developments in metallurgy and heat-treating processes in order to improve our products or its parts?

Are we keeping sufficiently posted on improvements in production equipment so that we can be sure that we have not overlooked an opportunity for profitable replacement?

Are we using our cost records productively? Do they help us to reduce costs or merely record history?

Are we doing lifting and carrying by man power that might better be done by machinery?

Of the power that we buy or generate, do we know how much is lost through inefficient transmission, and how much of this loss can be eliminated?

Is the arrangement of our machinery such as to make the fullest use of floor space and minimize footsteps?

Are our methods of training and developing minor executives such as properly to perpetuate the organization?

These, of course, are but a few of the many questions that may be asked by the industrial executive. Others will suggest themselves, or should be systematically sought for.

Why not make it a practice to look for questions in your weekly reading of THE IRON AGE? That is one very profitable way to use a technical journal.

The Myth of Technological Unemployment

THE story is told of a certain man who wished to establish himself as an authority on industrial economics. Desiring to take the shortest cut to fame and public recognition, he consulted a publicity expert as to the best way to get his name and opinions in the newspapers. "Find something to attack," advised the expert, "something of general interest or acceptance, and then go for it with the big stick. That will get you there quicker than anything else you can do."

"But what can I find to attack?" asked the would-be authority. "If nothing else occurs to you," replied the publicity man, "you might take a fling at the status quo. Plenty of others are doing it."

Perhaps this is one of the reasons that have impelled a number of economists (?) and social reformers to seize their literary cudgels recently in an attack upon mechanized industry, the monster that is devouring jobs so fast that before long everything will be done by pressing a button. "And who will own the button?" ask these gentlemen.

The present relaxation of employment conditions, which has accompanied industry's natural and necessary reaction after the longest and loudest "boom" it has ever experienced, plus the fact that adequate and accurate current employment data are not available, give these champions of the "good old days" just the sort of verbal opportunity that they are looking for. Unfortunately, their arguments may be taken seriously by those who are not in position to pick the flaws in them.

Accurate Federal statistics of current unemployment would settle this debate in short order. Unfortunately, we do not have them. And if we did have them, they would have to be properly analyzed and compared before deductions could properly be drawn from them.

However, there are, fortunately, long-term statistics available that prove, without any room for argument, that mechanized industry in the United States has actually been a beneficent multiplier of jobs and wages, and not a diminisher of either.

The Machine Age had its birth in the 1850's, with the invention of the Bessemer steel process. During the time from then to now there has been an amazingly rapid succession of development, improvement and invention of what we call labor-saving machines.

What has this intensive period of introduction of new methods and new machines done to employment?

In 1849, the United States had a population of 23,000,000. There were 957,000 wage earners employed in the work shops of that day, about 10,000 in railroad work and possibly 500 or less in the embryo telegraph systems. The total of industrial, railroad and communication employees was 967,500. Putting it in simpler form, one person in every 23 in the United States at the beginning of the Machine Age was employed industrially, in transportation or in communication service.

In 1925, the population of the United States had grown fivefold, and the workers in these activities had increased more than tenfold. One person in every eleven of our population was employed in industrial plants, on railroads or in communication service.

Measured on the only basis that is accurate and fair—the ratio of wage earners to total population—the Machine Age has not diminished employment opportunities, but has doubled them. Were the industrial methods of 1850 in vogue today more than half of our present wage earners would be without opportunity for employment in industry.

Improvement and invention do cause the need of readjustment and of transfer of effort, but they leave two opportunities for employment where they found but one.

Heavier Rails, Too, Are Cheaper

COMMENT has frequently been made in these columns about the desirability of economizing by using more and better steel. Indeed, it is a fundamental editorial thesis. It may seem that "more steel means less ultimate cost" is something of a paradox, but its truth has been demonstrated in many cases. To quote but a few instances: Steel towers are better for electrical transmission lines than wooden poles; it has been found that the more steel is put into a roadway the lighter yet more enduring it is; and that the battle-deck floor will save height and column loads on tall buildings. It begins to appear that similar economies may be achieved when more and better steel is put into railroad track.

Railroad engineers are fond of saying that they are not interested in buying steel—what they want is something which will carry the traffic safely. Steel men retort that the only thing which can withstand the mounting wheel loads and main-line speeds is the highest grade of open-hearth steel made under exacting care, and they complain that the railroads now decline to pay as much per pound (considering the post-war value of the dollar) as they did 30 years ago for the

first open-hearth rails bought to supersede the lighter and more brittle Bessemer product.

The average railroad engineer would say that the improvements made during the past generation are a bigger rail, with metal better apportioned between head, web and base, and harder because of higher carbon content. He realizes that the battle between the destructive action of heavier wheel loads and the resisting action of harder and stronger rails is parallel to the unending competition between high explosive projectile and armor plate. So far the wheel load has much the advantage. It is easy for a railroad president to authorize more powerful locomotives and heavier freight car loadings, because the good influence on net operating income is immediate and apparent. Strengthening the road-bed a corresponding amount is a slow and tedious job, and looks like nothing so much as a great big expense item. Consequently the records of rails broken under traffic remain at a discouragingly high percentage.

At this juncture an economic study of the value of the heavier rail is particularly welcome. Kansas City Southern Railway, when first built, was laid with 60-lb. rail. In 1905, when the heaviest engine axle load was 40,000 lb., the standard was fixed at 85 lb., thinking that it had a considerable margin of safety. Now with heavier wheel loads (as much as 60,000 lb.) on fast freight engines, the question arises—"What weight of rails should we be buying for the main line?" A. N. Reece, the chief engineer, studied the problem, and reached the answer: "One hundred and thirty-five pounds per yard." In other words, more steel will be cheaper.

The principal objection to heavy rails, of course, is the cost in track. It costs $15,700 a mile to buy and lay a mile of 135-lb. rails, as compared with $11,400 for the 85-lb. section. Even though the life will be longer and the salvage value greater, the depreciation and interest on the rail and fastenings per million gross tons of traffic is steadily greater for heavier and heavier rail, ranging from $190 for the 85-lb. section to $230 for the 150-lb. section. Clearly, then, the economy of using heavier rail must come from collateral advantages.

These collateral items occupied Mr. Reece's attention. Disregarding the fact that the stresses in a 135-lb. rail imposed by given traffic are hardly half those in an 85-lb. section, with an equivalent improvement in the factor of safety and reduction in liability to disastrous wrecks, he finds that the stiffer rail is easier to maintain (requires less track labor), is easier on the ties, easier on rolling stock, and offers less resistance to rolling wheel loads.

Representative figures may be quoted (all on the basis of million gross tons of traffic and a mile of track): Maintenance for an 85-lb. rail costs $120; for a 127-lb. rail, only $49. Six dollars more is saved on tie renewals. A large amount of the larger fixed charges on heavier rail is wiped out already. A smoother running track will cut the maintenance of equipment $34, and another $18 comes from a lessened train resistance from a lesser wave action in the stiffer rail ahead of the wheels. These factors vary at different rates for different sections of rail, but their summation clearly shows a minimum cost, from an operating standpoint, for the 135-lb. rail.

The analysis does not answer the moot question of whether the wheel loads are not so large that heat treated or alloy steel is necessary to withstand localized plastic flow and prevent ultimate breakdown. But even when a metal can be put into tonnage rails which is harder and stronger under the wheel contacts than the present standard metal, the analysis will remain true; namely, that under a moderate intensity of traffic it is cheaper to install a *very* heavy rail on an expensive roadbed, than to attempt to operate the trains over a section just light enough to keep the rolling stock out of the ditch.

Finished Steel Tonnage in 1929

SINCE last year was an exceptional one in total steel production, the statistics now presented of production by finished lines are of particular interest. As would be expected, nearly all the finished products did well. One notes that several products that showed relatively small increases over 1928 had registered unusual gains in that year. Bars and sheets were particular examples.

The last three record steel years were 1926, 1928 and 1929, the year 1927 being off as a whole but really only in its second half. It is well, therefore, to compare last year with both 1926 and 1928. Last year's changes from the two years are shown below.

Changes in 1929 Production, Per Cent

	From 1926	From 1928
Steel ingots	+16.9	+9.0
Rolled steel	+16.6	+9.2
Rolled iron	−12.7	−2.0
Total rolled	+15.7	+9.0
Rails	−15.4	+2.8
Merchant bars	+18.2	+3.1
Concrete bars	+16.7	+0.2
Shapes	+22.2	+16.7
Plates	+19.5	+28.3
Sheets	+24.0	+5.9
Rods	+15.1	+1.7
Strips	+104.8	+15.8
Pipe	−11.3	+3.2
Tubes	+68.1	+20.8
Tin plate	+10.4	+7.0
Wire nails	−11.9	−8.0

The relationship between finished rolled steel and steel ingots has been practically constant in the last few years, at about 74 per cent. Before the war 76 per cent was the usual proportion. In a general way it would appear that if the mills produce sounder ingots than formerly their customers have gone further still in demanding quality. The decline in rolled iron at this time is of no particular significance, as the recession has been practically continuous since 1917. Last year's rolled iron was only 1.2 per cent as much as the rolled steel.

Referring in detail to some of the items in the table, rail production was reported separately a couple of months ago and was discussed in our issue of April 10, the point being made that the increase over 1928 was probably due to more anticipatory rolling late in 1929 than late in 1928. In general, rail production trended downward after 1926.

Merchant bars did so well in 1928 that much gain could not be expected for 1929, which showed slightly

The Week in Business

Drift of Current Financial and Economic Opinion

LITTLE change in business activity is found by commentators reviewed this week. Prices are "definitely stiffer," or are undergoing "still further recession," depending on the list scanned and the point which the observer is trying to make. Ford's reduction in prices for his cars has been cited as one instance of falling prices.

Some upturn in business toward the end of August, or a little later, regarded as practically certain by some, will be due, *Annalist* thinks, "to normal requirements for crop marketing and preparations for the winter season." This rise will, it is said, be very moderate, and "any advance of great dimensions would of necessity be essentially speculative."

Not Much Encouragement in Sight

Still unfavorable, is the general verdict regarding the prospect for the immediate future. In retrospect, May is assessed as below April in activity, though the change is said to be inconsequential. But, with the summer doldrums approaching, and no upward momentum in being, observers are not inclined to be optimistic. National Industrial Conference Board notes "few signs of immediate rejuvenation. . . .

"Occasionally of late," that organization says, "there are signs of improved prices, and it will take probably few signs to bring about a real improvement. . . . When the knowledge comes home that there is nothing more to be saved by waiting, unfilled orders . . . should expand."

A Plea for All to Pull Together

How long business will continue to be unsatisfactory depends, in the opinion of National City Bank of New York, "on how much resistance is offered to forces working to reestablish equilibrium. . . . Groups seeking special advantages disturb equilibrium and retard general recovery. There has been some spring recovery but, allowing for this seasonal factor, not much in the way of general business improvement can be claimed."

General building activity shows little definite improvement. *Business Week* notes that the four-weeks moving daily average of general contract awards has declined to the level at end of March. That paper's index of building is now nearly 20 per cent below normal, having dropped 2.7 points last week. Its index of general activity stands at 92.7, compared with 94.5 in the previous week and with 110.3 one year ago. It is now at the lowest point since February.

Easy money rates continue, but, says the periodical last quoted, "Easy money conditions still are more a sign of low business spirits than an active force for recovery. More vigorous business initiative and more rapid expansion of credit are needed now." That paper finds the American market absorbing new securities—mainly bonds—at a more rapid rate this year than last.

Good Profits in Some Lines

Profits have not been lacking, either. Three hundred corporations in 25 lines of business showed net profits of $344 millions in the first quarter, against $438 millions last year, a drop of 21 per cent. But profits were 28 per cent higher than normal dividend requirements, all but seven lines showing enough profits to avoid encroaching on surplus.

Alexander Hamilton Institute finds that, in eight lines, profits were higher this year than last. But these lines are mainly those catering to an amusement-loving and luxury-demanding public. Six amusement companies earned almost three times their dividends, and made half as much again as they did last year. "Possibly the average individual has more time for recreation now than formerly. Perhaps there is a diversion from high-priced to low-priced amusement. . . . But—a different picture is presented when the earnings of corporations producing capital rather than directly consumable goods are considered."

more increase in bars over 1926 than did total steel. Concrete bars have not done particularly well. Shapes show a large gain by either comparison, as would be expected from the large amount of fabricated structural activity.

The great gain in plates cannot be accounted for in the old channels of consumption, and was evidently due largely to the manufacture of electrically welded pipe, which is not reported as a tubular product. Production of what is called "welded pipe" was in usual relationship to the reported skelp production, plates used for fire welding pipe being evidently returned as skelp.

Sheets held their ground fairly well despite the large gain in strips. While strips run much less than sheets in total tonnage their tonnage gain exceeded that of sheets. From 1926 to 1929 sheets gained 1,017,519 tons, from 4,237,479 tons to 5,254,998 tons, while strips gained 1,280,704 tons, from 1,222,089 tons to 2,502,793 tons.

The Electric Hoist Manufacturers Association will hold its next meeting at Hotel Statler, Buffalo, July 11.

Machine Tool Sales On Instalments Discussed

Selling machine tools on the instalment plan was discussed at the spring convention of the Associated Machine Tool Dealers at Granville, Ohio, June 4 and 5. Omar S. Hunt, president, Marshall & Huschart Machinery Co., Chicago, read a paper on this subject. The keynote was a plea for recognition of the part that instalment buying is now taking in the machine tool field and a demand that machine tool dealers, in the handling of "time sales," recognize the need for proper interest and financing charges. The opportunity to encourage machine tool installations by instalment sales was touched on as follows in Mr. Hunt's paper:

"A survey of the machine tool industry showed that 44 per cent of the machine tools in the United States were 10 years old or more, and I believe that this is conservative when applied to the present time. If we can go into a plant and show a modern tool that will save time and money and give the prospective buyer a reasonable period in which to pay for it, we think we would have a much better chance of selling than if we demand cash in 30 days."

Another subject of discussion was the sales contract developed by joint action of the association and a committee of the National Machine Tool Builders' Association. The committee report on this topic was presented by L. H. Swind, president, Swind Machinery Co., Philadelphia.

Other discussions covered the handling of open lines of machine tools, which was led by Homer Strong, and reciprocity as it affects the sale of machine tools, led by Harry Barney.

R. N. McClure, former president of the American Trade Association Executives, addressed the machine tool dealers.

Officers of the Associated Machine Tool Dealers are: President, E. P. Essley, secretary, E. L. Essley Machinery Co., Chicago; vice-president, J. W. Wright, Colcord-Wright Machinery & Supply Co., St. Louis; secretary-treasurer, A. G. Bryant, general manager machinery division, Joseph T. Ryerson & Son, Inc., Chicago.

Superheater Co. has moved its New York office to the Lincoln Building, 60 East Forty-second Street.

Iron and Steel Markets

Structural Steel Prospects Bright

New Fabricating Projects Total 112,000 Tons— Pipe Mills Booked for Four Months— Total Ingot Output Again Declines

WITH seasonal reaction increasingly evident and affecting most branches of trade, activity in structural work and line pipe is conspicuous as the principal sustaining influence in the steel market.

New inquiries for structural projects, at 112,000 tons, are the largest for any week this year and exceed by 20,000 tons the highest weekly total in 1929. Although lettings, at 34,000 tons, were only of fair proportions, the outlook is for a steady rise in the volume of awards. In New York, where much of the large construction work of the country is concentrated, the upward trend in structural contracts began last month. Total lettings in the metropolitan district in May were 55,000 tons, compared with 28,000 tons in April and 38,000 tons in March.

Pipe line business recently placed, estimated as approaching 1,000,000 tons, is taxing the capacity of the country. Producers of lapweld and seamless pipe in 8-in. and larger diameters are fully committed for four months. The Milwaukee fabricator of electrically welded pipe is also heavily booked and is running three shifts a day. Chicago plate mills are being pressed to supply the steel requirements for the electric product and are now insured of full operations through June and July. The large backlogs of Chicago plate producers were augmented last week by orders for more than 80,000 tons. In addition, a sizable tonnage of plates was placed with mills east of the Chicago district.

Despite improvement in these two important outlets for tonnage, the trend of steel ingot production is still downward. The general average for the country at large is 69 per cent, compared with 72 per cent a week ago. The decline of 294,993 tons in the unfilled orders of the United States Steel Corporation in May and the seasonal slackening in most steel consuming lines point to still further recession in output.

The only question on which there is disagreement is how much further the decline will go and how long it will last. Leaders of the industry whose forecasts have proved dependable in the past predict that a gradual expansion in business will make its appearance within 30 or 60 days and that fall production will range from 75 to 80 per cent.

Steel ingot production figures for May again emphasize the fact that this year's record looks unfavorable chiefly because of comparison with 1929. The daily rate of output, 149,066 tons, was 24 per cent lower than the average for May, 1929. Production in the first five months, 20,352,960 tons, was nearly 16 per cent smaller than in 1929, but except for that year, 1928 and 1926, was the largest ever reported for such a period.

Tin plate output continues to show a seasonal decrease. The year has shown a substantial decline in the requirements of paint manufacturers and makers of oil cans, but demands from the food container manufacturers have shown a gain. In the past few years the canning business has been consistently expanding 10 per cent annually, and it now seems assured that this year's increase over 1929 will be fully that much.

Heavy melting steel scrap has held its advance at Pittsburgh, but has declined 25c. a ton at Chicago. Old material markets in most centers are dull and without trend.

Finished steel prices are still subject to concession, but have been free from additional open breaks except for a decline of $2 to $3 a ton on long ternes and a reduction in the East of $1 a ton on plates. Waiving of silicon differentials on pig iron has become more common, but base prices have undergone no further change.

Railroad buying continues to show retrenchment. Rail mill output, which usually shrinks at this time of the year, has been reduced to 70 per cent of capacity at Chicago and further curtailment is looked for in the near future. The Pittsburgh & West Virginia is in the market for 5000 tons, the only sizable inquiry for rails pending, with the exception of 40,000 tons on which the Norfolk & Western asked for figures a fortnight ago.

Steel specifications from bolt, nut and rivet manufacturers have expanded, following the recent downward revision of their prices. Radio plants and a few other smaller outlets for steel are becoming more active. Concrete bar demand remains good. On the other hand, automobile output is expected to show a further moderate recession this month, and farm equipment manufacturers, who have already slowed down their operations, plan additional curtailment.

THE IRON AGE composite prices are unchanged. Pig iron, at $17.50 a gross ton, is $1.13 lower than a year ago; finished steel, at 2.214c. a lb., is $3.96 a net ton lower.

A Comparison of Prices

Market Prices at Date, and One Week, One Month and One Year Previous, Advances Over Past Week in Heavy Type, Declines in Italics

	June 10, 1930	June 3, 1930	May 13, 1930	June11, 1929
Pig Iron, Per Gross Ton:				
No. 2 fdy., Philadelphia	$19.76	$19.76	$19.76	$21.76
No. 2, Valley furnace	18.50	18.50	18.50	18.50
No. 2 Southern, Cin'ti	16.69	16.69	16.69	18.69
No. 2, Birmingham	14.00	14.00	14.00	15.00
No. 2 foundry, Chicago*	18.50	18.50	19.00	20.00
Basic, del'd eastern Pa	18.75	18.75	18.75	20.25
Basic, Valley furnace	18.50	18.50	18.50	18.50
Valley Bessemer, del'd P'gh	20.76	20.76	20.76	20.76
Malleable, Chicago*	18.50	18.50	19.00	20.00
Malleable, Valley	19.00	19.00	19.00	19.00
L. S. charcoal, Chicago	27.04	27.04	27.04	27.04
Ferromanganese, furnace	94.00	94.00	94.00	105.00
Rails, Billets, Etc., Per Gross Ton:				
Rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Light rails at mill	36.00	36.00	36.00	36.00
Rerolling billets, Pittsburgh	31.00	31.00	33.00	36.00
Sheet bars, Pittsburgh	31.00	31.00	33.00	36.00
Slabs, Pittsburgh	31.00	31.00	33.00	36.00
Forging billets, Pittsburgh	37.00	37.00	38.00	41.00
Wire rods, Pittsburgh	36.00	36.00	36.00	42.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb	1.70	1.70	1.80	1.85
Finished Steel, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Bars, Pittsburgh	1.75	1.75	1.75	1.95
Bars, Chicago	1.85	1.85	1.85	2.05
Bars, Cleveland	1.75	1.75	1.75	1.95
Bars, New York	2.08	2.08	2.09	2.29
Tank plates, Pittsburgh	1.70	1.70	1.75	1.95
Tank plates, Chicago	1.80	1.80	1.85	2.05
Tank plates, New York	*1.93*	1.98	1.97½	2.22½
Structural shapes, Pittsburgh	1.70	1.70	1.75	1.95
Structural shapes, Chicago	1.80	1.80	1.85	2.05
Structural shapes, New York	1.90½	1.90½	1.94½	2.19½
Cold-finished bars, Pittsburgh	2.10	2.10	2.10	2.30
Hot-rolled strips, Pittsburgh	1.70	1.70	1.70	1.90
Cold-rolled strips, Pittsburgh	2.45	2.45	2.55	2.75

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

	June 10, 1930	June 3, 1930	May 13, 1930	June 11, 1929
Finished Steel, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Sheets, black, No. 24, P'gh	2.55	2.55	2.55	2.85
Sheets, black, No. 24, Chicago dist. mill	2.65	2.65	2.65	3.05
Sheets, galv., No. 24, P'gh	3.20	3.20	3.20	3.60
Sheets, galv., No. 24, Chicago dist. mill	3.30	3.30	3.30	3.80
Sheets, blue, No. 13, P'gh	2.15	2.15	2.15	2.35
Sheets, blue, No. 13, Chicago dist. mill	2.25	2.25	2.25	2.45
Wire nails, Pittsburgh	2.15	2.15	2.15	2.65
Wire nails, Chicago dist. mill	2.20	2.20	2.20	2.70
Plain wire, Pittsburgh	2.30	2.30	2.30	2.50
Plain wire, Chicago dist. mill	2.35	2.35	2.35	2.55
Barbed wire, galv., Pittsburgh	2.80	2.80	2.80	3.30
Barbed wire, galv., Chicago dist. mill	2.85	2.85	2.85	3.35
Tin plate, 100 lb. box, P'gh	$5.25	$5.25	$5.25	$5.35
Old Material, Per Gross Ton:				
Heavy melting steel, P'gh	$15.25	$15.25	$15.50	$18.25
Heavy melting steel, Phila	13.00	13.00	13.50	16.00
Heavy melting steel, Ch'go	*12.00*	12.25	12.50	15.00
Carwheels, Chicago	*13.50*	13.75	14.00	14.25
Carwheels, Philadelphia	14.50	14.50	15.00	16.00
No. 1 cast, Pittsburgh	14.25	14.25	14.25	15.50
No. 1 cast, Philadelphia	14.00	14.00	14.00	16.50
No. 1 cast, Ch'go (net ton)	12.75	12.75	12.75	15.00
No. 1 RR. wrot., Phila	15.00	15.00	15.00	16.00
No. 1 RR. wrot., Ch'go (net)	10.50	10.50	11.25	13.50
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$2.50	$2.50	$2.50	$2.75
Foundry coke, prompt	3.50	3.50	3.50	3.75
Metals, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Lake copper, New York	13.12½	13.12½	13.00	18.12½
Electrolytic copper, refinery	12.75	12.75	12.75	17.75
Tin (Straits), New York	30.37½	30.12½	32.87½	44.50
Zinc, East St. Louis	*4.60*	4.65	4.60	6.65
Zinc, New York	*4.95*	5.00	4.95	7.00
Lead, St. Louis	5.40	5.40	5.50	6.80
Lead, New York	5.50	5.50	5.60	7.00
Antimony (Asiatic), N. Y.	*7.10*	7.25	7.50	9.00

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

PITTSBURGH

Steel Demands from Leading Consuming Industries Decline Further

PITTSBURGH, June 10.—Line pipe remains the bright spot in an otherwise drab steel market. On welded and seamless pipe, 8 in. in diameter and larger, makers as a whole have fully four months' business booked, and those that are not that well off still have an opportunity to become so, as on a good deal of business some producers cannot make prompt enough deliveries to secure the order. The situation with most other products is substantially the reverse of that in line pipe, even other classes of tubular goods not sharing in the strong demand for gas and gasoline conveyors.

Demands from the leading consuming industries have definitely turned downward in the past week. Most of the rails contracted for 1930 delivery have been rolled and shipped. Railroad buying of other products is light and railroad equipment manufacturers no longer have very large steel requirements. The agricultural implement industry, following four months of record business, has materially lessened its steel purchases, and there continues to be a steady tapering off in the purchases and specifications by the automobile builders.

Steel ingot production is reflecting the smaller demand. While the Wheeling district producers are running virtually full, there are a number of plants scattered through other portions of the greater Pittsburgh district which are not doing much better than 50 per cent of capacity, and it is doubtful whether the general average of ingot output for the entire area, including Youngstown and Johnstown, is much in excess of 65 per cent, as compared with 70 per cent last week.

As is true of markets of the present type, reciprocity is a strong factor in the determination as to the destination of orders, and another is continued irregularity in prices. Notwithstanding that in the past week or 10 days some effort has been made to bring about steadier conditions in sheets and strips, most producers regard the present published minimum quotations as altogether too close for comfort to the actual cost and propose to make a stand at these prices. One large producer of sheets has announced third quarter prices on the basis of today's minimum quotations. Nevertheless, concessions have not disappeared in either of these lines. An increase in the capacity for producing long ternes, finding extensive use as automobile gasoline tanks, has resulted in a decline in prices of from $2 to $3 a ton. The market is quite steady on cold-finished steel bars. In fact, it is commented upon that the price is holding so well in the face of lighter demand. Tin plate also appears to be holding well, although now entering upon the usual summer lull.

There is very little change in the primary materials, the advance of a week ago in steel works grades of scrap being sustained by the fact that offerings of heavy melting steel in the railroad lists brought on an average

of about $15.50, and one sale of heavy melting steel of strictly No. 1 grade at $15.50 was made to a consumer in this district. Firmness in the scrap market at this stage is not significant. Recent heavy purchases appear to have been dictated less by the need of scrap than by belief that heavy melting steel at around $15 was a good speculation. Another factor is the lighter production of scrap among steel fabricators, particularly in the Detroit district.

Pig Iron.—Shipments appear to be equal to or slightly in excess of current production, which, so far as merchant iron is concerned, now is confined to one Pittsburgh district stack and two in the Valleys. Prices given below, it should be emphasized, are strictly local to the districts mentioned. Valley furnaces shipping into the Pittsburgh district have to meet the price of the Pittsburgh district furnace, and the result is a lower net quotation at the Valley furnaces. As is true in other distributing points, the Pittsburgh furnaces have a price for local delivery, and another one for outside deliveries, and this is made necessary by competitive conditions.

Prices per gross ton, f.o.b. Valley furnace:

Basic	$18.50
Bessemer	19.00
Gray forge	18.00
No. 2 foundry	18.50
No. 3 foundry	18.00
Malleable	19.00
Low phos., copper free	$26.66 to 27.00

Freight rate to Pittsburgh or Cleveland district, $1.76.

Prices per gross ton, f.o.b. Pittsburgh district furnace:

Basic	$19.00
No. 2 foundry	19.00
No. 3 foundry	18.50
Malleable	19.50

Freight rates to points in Pittsburgh district range from 63c. to $1.13.

Semi-Finished Steel.—Specifications for billets, slabs and sheet bars sharply reflect the low rate of operations in sheet, tin and strip mills. Business, apart from shipping instructions on contracts, is as light as it usually is when there is no shortage of supplies. Wire rods are holding steadily at $36, Pittsburgh or Cleveland, with just a fair movement.

Bars, Plates and Shapes.—Business has lost more ground since a week ago, but at that the volume of orders and specifications is much more satisfactory than the prices at which these products have to be sold. Structural steel lettings to local fabricators in the past week amounted to 2000 tons, and six barges, which also will be built here, account for 1500 tons of plates and small shapes. These barges are the first lettings in some time, but builders are not hopeful that they mean material improvement in the demand, owing to the fact that it is rather late for barges ordered now to be fabricated and launched much before the end of the year. Fabricated structural steel business is in fair volume, but, as has been the case for some time, prices are highly competitive. Prices on bars, shapes and plates are unchanged. Reinforcing bar business has fallen off. Chief interest is in a 2000-ton power dam project at Safe Harbor, near Columbia, Pa.

Excepting line pipe business, general trend of steel buying continues downward.

* * *

Steel ingot production in greater Pittsburgh area not now above 65 per cent of capacity.

* * *

One sheet producer announces present prices as minimum for third quarter. Long ternes decline $2 to $3 a ton.

* * *

Advance of a week ago in heavy melting steel sustained by prices paid for railroad offerings and by another open market sale at $15.50.

Tubular Goods.—Almost all makers of welded and seamless pipe, 8 in. in diameter and larger, are well supplied with business. They have at least four months' production already booked and not all of the business that has been mentioned has yet been placed. Estimates run as high as 1,000,000 tons in the orders already distributed, but this figure is regarded as somewhat high in view of the fact that on some lines the right of way is yet to be secured. Standard pipe is slow in keeping with the reduced home construction activities and the demand for oil country pipe reflects the overproduction of oil in the generally unsatisfactory situation in that industry. There is a slow market in tubing, chiefly because the two principal sources of outlet, the railroads and the automobile industry, are not buying very freely.

Wire Products.—Some makers here note a slight pick-up in the past week in their specifications, but not enough to cause any change in the description of the character of the business. The market really is rather dull, but so far as this immediate district is concerned prices are holding well. There are suggestions that less than $2.15, base, per keg for nails is being done along the Atlantic Seaboard, but in this territory the price is well maintained, probably because the margin of profit is so slim at that figure that pressure to sell is slight.

Sheets.—Business is neither better nor worse than it has been over the past few weeks, but if there is a definite tendency to demand it is lower. Although it has not occurred yet, lighter demand by the automotive industry is generally expected. Even the Ford Motor Co., which has been producing approximately 42 per cent of the total number of cars, is expected to reduce production next month, although a report that this company had expected to shut down completely for two weeks is not generally credited. The railroads are rather sparing buyers of sheets, and the agricultural implement industry, after a period of four months of record activity, has let down in its purchases.

Prices appear to be fairly steady, although in the past week long ternes, which have been nominally quoted at 3.80c., Pittsburgh, eased off to a range of from 3.65c. to 3.75c. Makers of continuous mill sheets are taking a firmer stand and this development has lent some firmness to blue annealed sheets.

The Iron Age Composite Prices

Finished Steel

June 10, 1930, 2.214c. a Lb.

One week ago	2.214c.
One month ago	2.228c.
One year ago	2.412c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products make 87 per cent of the United States output of finished steel.

	High	Low
1930	2.362c., Jan. 7;	2.214c., May 20
1929	2.412c., April 2;	2.362c., Oct. 29
1928	2.391c., Dec. 11;	2.314c., Jan. 3
1927	2.453c., Jan. 4;	2.293c., Oct. 25
1926	2.453c., Jan. 5;	2.403c., May 18
1925	2.560c., Jan. 6;	2.396c., Aug. 18

Pig Iron

June 10, 1930, $17.50 a Gross Ton

One week ago	$17.50
One month ago	17.58
One year ago	18.63

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High	Low
1930	$18.21, Jan. 7;	$17.50, June 3
1929	18.71, May 14;	18.21, Dec. 17
1928	18.59, Nov. 27;	17.04, July 24
1927	19.71, Jan. 4;	17.54, Nov. 1
1926	21.54, Jan. 5;	19.46, July 13
1925	22.50, Jan. 13;	18.96, July 7

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel	*Base per Lb.*
F.o.b. Pittsburgh mill	1.75c.
F.o.b. Chicago	1.85c.
Del'd Philadelphia	2.04c.
Del'd New York	2.08c.
F.o.b. Cleveland	1.75c. to 1.80c.
F.o.b. Lackawanna	1.85c. to 1.90c.
F.o.b. Birmingham	1.95c. to 2.00c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills	2.35c.
Billet Steel Reinforcing	
F.o.b. P'gh mills, 40, 50, 60-ft.	1.75c. to 1.80c.
F.o.b. P'gh mills, cut lengths	2.00c. to 2.05c.
F.o.b. Birmingham, mill lengths	1.95c. to 2.00c.
Rail Steel	
F.o.b. mills, east of Chicago dist.	1.65c. to 1.70c.
F.o.b. Chicago Heights mill	1.75c.
Del'd Philadelphia	1.94c. to 1.99c.
Iron	
Common iron, f.o.b. Chicago	1.90c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.09c.
Common iron, del'd New York	2.14c.

Tank Plates

	Base per Lb.
F.o.b. Pittsburgh mill	1.70c. to 1.75c.
F.o.b. Chicago	1.80c.
F.o.b. Birmingham	1.95c. to 2.00c.
Del'd Cleveland	1.88½c.
Del'd Philadelphia	1.90½c. to 1.95½c.
F.o.b. Coatesville	1.80c. to 1.85c.
F.o.b. Sparrows Point	1.80c. to 1.85c.
F.o.b. Lackawanna	1.80c. to 1.85c.
Del'd New York	1.93c. to 1.98c.
C.i.f. Pacific ports	2.20c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh mill	1.70c. to 1.75c.
F.o.b. Chicago	1.80c.
F.o.b. Birmingham	1.95c. to 2.00c.
F.o.b. Lackawanna	1.80c. to 1.85c.
F.o.b. Bethlehem	1.80c. to 1.85c.
Del'd Cleveland	1.88½c.
Del'd Philadelphia	1.81c. to 1.86c.
Del'd New York	1.90½c. to 1.95½c.
C.i.f. Pacific ports	2.35c.

Hot-Rolled Hoops, Bands and Strips

	Base per Lb.
6 in. and narrower, P'gh	1.75c. to 1.80c.
Wider than 6 in., P'gh	1.65c. to 1.70c.
6 in. and narrower, Chicago	1.90c.
Wider than 6 in., Chicago	1.80c.
Cooperage stock, P'gh	2.10c.
Cooperage stock, Chicago	2.20c.

Cold-Finished Steel

	Base per Lb.
Bars, f.o.b. Pittsburgh mill	2.10c.
Bars, f.o.b. Chicago	2.10c.
Bars, Cleveland	2.10c.
Bars, Buffalo	2.10c.
Shafting, ground, f.o.b. mill	*2.45c. to 3.40c.
Strips, P'gh	2.45c. to 2.55c.
Strips, Cleveland	2.45c. to 2.55c.
Strips, del'd Chicago	2.73c. to 2.83c.
Strips, Worcester	2.60c. to 2.70c.
Fender stock, No. 20 gage, Pittsburgh or Cleveland	3.80c.

*According to size.

Wire Products

(Carload lots, f.o.b. Pittsburgh and Cleveland.)

To Merchant Trade	*Base per Keg*
Standard wire nails	$2.15 to $2.25
Cement coated nails	2.15 to 2.25
Galvanized nails	4.15 to 4.25
	Base per Lb.
Polished staples	2.60c. to 2.70c.
Galvanized staples	2.85c. to 2.90c.
Barbed wire, galvanized	2.80c. to 2.90c.
Annealed fence wire	2.30c. to 2.40c.
Galvanized wire, No. 9	2.75c. to 2.85c.
Woven wire fence (per net ton to retailers)	$65.00
To Manufacturing Trade	
Bright hard wire, Nos. 6 to 9 gage	2.30c.
Spring wire	3.30c.
(Carload lots, f.o.b. Chicago)	
Wire nails	$2.20 to $2.30 (keg)
Annealed fence wire	2.40c. to 2.50c. (lb.)
Bright hard wire to manufacturing trade	2.35c.

Anderson, Ind., mill prices are ordinarily $1 a ton over Pittsburgh base; Duluth, Minn., and Worcester, Mass., mill $2 a ton over Pittsburgh, and Birmingham mill $3 a ton over Pittsburgh.

Cut Nails

	Per 100 Lb.
Carloads, Wheeling, Reading or Northumberland, Pa.	$2.45 to $2.50
Less carloads, Wheeling or Reading	2.60

Light Plates

No. 10, blue annealed, f.o.b. P'gh	2.00c.
No. 10, blue annealed, f.o.b. Chicago dist.	2.10c.
No. 10, blue annealed, del'd Phila.	2.32c. to 2.42c.
No. 10, blue annealed, B'ham	2.20c.

Sheets

Blue Annealed	*Base per Lb.*
No. 13, f.o.b. P'gh	2.15c.
No. 13, f.o.b. Chicago dist.	2.25c.
No. 13, del'd Philadelphia	2.44c. to 2.54c.
No. 13, blue annealed, B'ham	2.35c.
Continuous Mill Sheets	
No. 10 gage, f.o.b. P'gh	1.80c. to 1.90c.
No. 13 gage, f.o.b. P'gh	1.95c. to 2.05c.
(Usual range 24 in. to 48 in. wide)	
Box Annealed, One Pass Cold Rolled	
No. 24, f.o.b. Pittsburgh	2.55c.
No. 24, f.o.b. Chicago dist. mill	2.65c.
No. 24, del'd Philadelphia	2.84c.
No. 24, f.o.b. Birmingham	2.70c.
Steel Furniture Sheets	
No. 24, f.o.b. P'gh	3.80c.
Galvanized	
No. 24, f.o.b. Pittsburgh	3.20c. to 3.30c.
No. 24, f.o.b. Chicago dist. mill	3.30c.
No. 24, del'd Cleveland	3.43¼c.
No. 24, del'd Philadelphia	3.49c.
No. 24, f.o.b. Birmingham	3.35c. to 3.40c.
Tin Mill Black Plate	
No. 28, f.o.b. Pittsburgh	2.75c. to 2.90c.
No. 28, f.o.b. Chicago dist. mill	2.90c. to 3.00c.
Automobile Body Sheets	
No. 20, f.o.b. Pittsburgh	3.70c.
Long Ternes	
No. 24, 8 lb. coating, f.o.b. mill	3.65c. to 3.75c.
Vitreous Enameling Stock	
No. 24, f.o.b. Pittsburgh	3.80c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills	$5.25
Standard cokes, f.o.b. Gary	5.35

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)
(Per Package, 20 x 28 in.)

8-lb. coating I.C.	$10.70
15-lb. coating I.C.	13.40
20-lb. coating I.C.	14.60
25-lb. coating I.C.	$15.90
30-lb. coating I.C.	16.80
40-lb. coating I.C.	18.80

Alloy Steel Bars

(F.o.b. maker's mill)
Alloy Quantity Bar Base, 2.65c. per Lb.

S.A.E. Series Numbers	Alloy Differential
2000 (½% Nickel)	$0.25
2100 (1½% Nickel)	0.55
2300 (3½% Nickel)	1.50
2500 (5% Nickel)	2.25
3100 Nickel Chromium	0.55
3200 Nickel Chromium	1.35
3300 Nickel Chromium	3.80
3400 Nickel Chromium	3.20
4120 Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600 Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel)	1.05
5100 Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100 Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100 Chromium Spring Steel	0.20
6100 Chromium Vanadium Bar	1.20
6100 Chromium Vanadium Spring Steel	0.95
9250 Silicon Manganese Spring Steel (flats)	0.25
Rounds and squares	0.50
Chromium Nickel Vanadium	1.50
Carbon Vanadium	0.95

Above prices are for hot rolled steel bars, forging quality. The differential for cold-drawn bars is ¾c. a lb. higher, with standard classification for cold-finished alloy steel bars applying. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis.

Billets under 4 x 4 in. carry the steel bar base. Slabs with a sectional area of 16 in. or over carry the billet price. Slabs with sectional area of less than 16 in. or less than 2½ in. thick, regardless of sectional area, take the bar price.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	36.00
Light (from rail steel), f.o.b. mill	34.00
Light (from billets), f.o.b. Ch'go mill	36.00

Track Equipment

	Base per 100 Lb.
Spikes, ⅜ in. and larger	$2.80
Spikes, ½ in. and smaller	2.80
Spikes, boat and barge	3.00
Tie plate, steel	2.07½
Angle bars	$2.75
Track bolts, to steam railroads	$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count	73 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel Inches	Black	Galv.	Iron Inches	Black	Galv.
⅛	47	21½	¼ and ⅜	+11	+36
¼ to ⅜	53	27½	½	23	5
½	58	44½	¾	28	11
¾	62	50½	1 and 1¼	31	15
1 to 3	64	52½	1½ and 2	35	18

Lap Weld

2	57	45½	2	23	9
2½ to 6	61	49½	2½ to 3½	28	13
7 and 8	58	45½	4 to 6	30	17
9 and 10	56	43½	7 and 8	29	16
11 and 12	55	42½	9 to 12	26	11

Butt Weld, extra strong, plain ends

⅛	43	26½	¼ and ⅜	+13	+48
¼ to ⅜	49	32½	½	23	7
½	55	44½	¾	28	12
¾	60	49½	1 to 2	34	18
1 to 1½	62	51½			
2 to 3	63	52½			

Lap Weld, extra strong, plain ends

2	55	44½	2	29	13
2½ to 4	59	48½	2½ to 4	34	20
4½ to 6	58	47½	4½ to 6	33	19
7 to 8	54	41½	7 and 8	31	17
9 and 10	47	34½	9 to 12	21	8
11 and 12	46	33½			

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Steel		Charcoal Iron	
2 in. and 2¼ in.	38	1½ in.	1
2½ in.—2¾ in.	46	1¾ in.	8
3 in.	52	2 in.—2¼ in.	13
3¼ in.—3¾ in.	54	2½ in.—2¾ in.	16
4 in.	57	3 in.	17
4½ in. to 6 in.	46	3¼ in. to 3½ in.	18
		4 in.	20
		4½ in.	21

On lots of a carload or more, the above base discounts are subject to a preferential of two fives on steel and of 10 per cent on charcoal iron tubes. Smaller quantities are subject to the following modifications from the base discounts:

Lap Welded Steel—Under 10,000 lb., 6 points under base and one five; 10,000 lb. to carload, 4 points under base and two fives. Charcoal Iron—Under 10,000 lb., 2 points under base; 10,000 lb. to carload, base and one five.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	61	3 in.	46
1¼ to 1½ in.	53	3¼ to 3½ in.	48
1¾ in.	37	4 in.	51
2 to 2¼ in.	32	4½, 5 and 6 in.	40
2½ to 2¾ in.	40		

Hot Rolled

2 and 2¼ in.	38	3¼ to 3½ in.	54
2½ and 2¾ in.	46	4 in.	57
3 in.	52	4½, 5 and 6 in.	46

Beyond the above base discounts a preferential discount of 5 per cent is allowed on carload lots. On less than carloads to 10,000 lb., base discounts are reduced 4 points with 5 per cent preferential; on less than 10,000 lb., base discounts are reduced 6 points, with no preferential. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gages take the mechanical tube list and discounts. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30% base (carloads)	55
Carbon, 0.30% to 0.40% base	50

Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

Tin Plate.—Mill operations show a tendency to decrease, owing to the fact that the container manufacturers now either have all of the tin plate or the manufactured cans they figure will be needed for the early canning season and are more disposed to lighten than to increase their inventories. If the canning crops are up to expectations, there probably will be no appreciable loss in the consumption of tin plate for that purpose as compared with last year, but as a whole shipments of tin plate so far this year have run between 8 and 10 per cent less than in the same period last year. There has been a substantial recession in the amount of tin plate going to the paint manufacturers, this being a reflection of the lighter home building work this year than last, while demands for tin plate for oil cans also are off materially.

Strip Steel.—The tendency among automobile manufacturers to reduce output with the approach of the season for the introduction of new models means a corresponding tapering in the demand for strip steel. Mill operations are less regular than recently, and the general engagement of hot mill capacity is not over 70 per cent, as compared with 75 per cent last week. Demands from other consuming industries are not sufficiently heavy to offset the loss in automobile tonnage.

Makers generally are quoting narrower strips at 1.80c., and those wider than 6 in. at 1.70c., base, but it is understood that there is a preferential of $1 a ton to large tonnage buyers. On cooperage stock 2.10c., base Pittsburgh, appears to be all that can be obtained. Cold-rolled strips are well sustained at 2.45c., base.

Cold-Finished Steel Bars.—Demand for this product is decreasing, as is true of most other products which find their principal use in the automobile industry. Makers, however, are making a firm stand on prices, and 2.10c., base, still is the quotable market.

Coal and Coke.—No considerable difficulty is experienced in finding spot beehive oven furnace coke at $2.50 a net ton, but this is due more to light demands than to really large supplies. As a matter of fact, one of the steel companies in the district had to have about 15 cars in a hurry and found it necessary to pay a little more to insure prompt delivery. The market is quotable at from $2.50 to $2.60. Foundry coke takes a spread of $3.50 to $4.85 a net ton at ovens. By far the greater percentage of the business has been the so-called premium brands, commanding $4.50 and higher. There is not much real activity in the coal market, this being indicated by the fact that total production is now down around 700,000 tons weekly. Consumption is being adversely affected by economies in use. Steel companies seem to be buying coal land instead of coal.

Old Material.—The market seems to be somewhat easier on steel foundry grades, but recent prices on steel works grades appear to get some support from the result of the offerings of railroad lists. There is some irregularity as to reports about business in the basic open-hearth grades, some dealers claiming that they could move large tonnages of heavy melting steel at $15 if they were disposed to take the orders, while others say that mill interest in the market now is slight and they do not know where to get that price. It seems doubtful that $15.50 can now be done, except possibly on strictly No. 1 railroad steel, and the more common mill bid is $15.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$15.00 to $15.50
No. 2 heavy melting steel	13.00 to 13.50
Scrap rails	14.50 to 15.00
Compressed sheet steel	14.75 to 15.25
Bundled sheets, sides and ends	13.00 to 13.50
Cast iron carwheels	14.00 to 14.50
Sheet bar crops, ordinary	16.00 to 16.50
Heavy breakable cast	11.00 to 11.50
No. 2 railroad wrought	15.00 to 15.50
Hvy. steel axle turnings	12.50 to 13.00
Machine shop turnings	9.75 to 10.25
Acid Open-Hearth Grades:	
Railr. knuckles and couplers	18.00 to 18.50
Railr. coil and leaf springs	18.00 to 18.50
Rolled steel wheels	18.00 to 18.50
Low phos. billet and bloom ends	19.00 to 19.50
Low phos. mill plates	17.00 to 18.00
Low phos. light grades	17.00 to 18.00
Low phos. sheet bar crops	18.00 to 19.00
Heavy steel axle turnings	12.50 to 13.00
Electric Furnace Grades:	
Low phos. punchings	17.50 to 18.00
Heavy steel axle turnings	12.50 to 13.00
Blast Furnace Grades:	
Short shoveling steel turnings	10.00 to 10.50
Short mixed borings and turnings	10.00 to 10.50
Cast iron borings	10.00 to 10.50
Rolling Mill Grades:	
Steel car axles	21.50 to 22.50
Cupola Grades:	
No. 1 cast	14.00 to 14.50
Rails 3 ft. and under	17.00 to 17.50

Warehouse Prices, f.o.b. Pittsburgh

	*Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.35c.
Squares and flats	3.85c.
Bands	3.25c.
Hoops	4.25c.
Black sheets (No. 24), 25 or more bundles	3.50c.
Galv. sheets (No. 24), 25 or more bundles	4.15c.
Light plates, blue annealed (No. 10), 1 to 24 plates	2.85c.
Blue annealed sheets (No. 13)	3.00c.
Galv. corrug. sheets (No. 28), per square	4.03c.
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count,	60 and 10 per cent off list
Machine bolts, 100 count,	60 and 10 per cent off list
Carriage bolts, 100 count,	60 and 10 per cent off list
Nuts, all styles, 100 count,	60 and 10 per cent off list
Large rivets, base per 100 lb.	$3.30
Wire, black, soft ann'l'd, base per 100 lb.	$2.60 to $2.70
Wire, galv. soft, base per 100 lb.	3.20 to 3.30
Common wire nails, per keg	2.45
Cement coated nails, per keg	2.65 to 2.80

*On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applies to orders of 400 to 3999 lb.

YOUNGSTOWN

Aided by Pipe Orders, Valley Mills Are Operating at 65 Per Cent

YOUNGSTOWN, June 10.—Steel company executives say that new business is in larger volume and is improving. Impetus has been given the industry in Youngstown by the placing of substantial orders for line pipe with both the Youngstown Sheet & Tube Co. and the Republic Steel Corporation.

Output this week will be maintained at 65 per cent, betterment in steel pipe schedules being offset by losses in flat-rolled steels. The Sharon Steel Hoop Co. will operate almost full, but did not start its finishing mills until today instead of Monday morning. The Newton Steel Co. is at a 60 per cent average. Sheet & Tube, Republic and Carnegie companies average 65 per cent. The Empire Steel Corporation is operating its Mansfield finishing mills and its Falcon plant at Niles at close to capacity, but has four rolling mill properties inactive.

Schedules show 28 of 51 independent open-hearth furnaces active; more than half of the 120 independent Valley sheet mills rolling; strip mill capacity at 70 per cent; tin plate mills at 75 per cent, and independent steel bar capacity at 60 per cent. The A. M. Byers Co. is operating its Girard works four days a week, instead of three days as heretofore.

New Haven Steel Treaters Elect New Officers

The annual frolic of the New Haven chapter of the American Society for Steel Treating will be held at the Wilcox's Pier Restaurant, Savin Rock, Conn., on Friday, June 20, at 7 p. m. Following a dinner there will be a program of entertainment.

For the coming year H. G. Keshian, Chase Companies, Waterbury, Conn., has been elected chairman, with F. J. Dawless, Crucible Steel Co. of America, New Haven, vice-chairman; F. E. Stockwell, Colonial Beacon Oil Co., New Haven, secretary, and W. G. Aurand, R. Wallace & Sons Mfg. Co., Wallingford, Conn., treasurer.

Standard specifications of steel hoops, width and gage, for tight barrels and kegs, other than I.C.C. barrels, were adopted by the manufacturers of tight barrels at the recent convention in St. Louis of the Associated Cooperage Industries of America.

American Steel & Wire Co., 208 South LaSalle Street, Chicago, has been made American licensee of the Bleichert & Bleichert-Zuegg systems, an aerial tramway used extensively in Europe.

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and under 10-in., Pittsburgh	$31.00 to $32.00
Rerolling, 4-in. and under 10-in., Youngstown	31.00
Rerolling, 4-in. and under 10-in., Cleveland	31.00
Rerolling, 4-in. and under 10-in., Chicago	34.00
Forging quality, Pittsburgh	37.00

Sheet Bars

(Open Hearth or Bessemer)

	Per Gross Ton
Pittsburgh	$31.00 to $32.00
Youngstown	31.00 to 32.00
Cleveland	31.00

Slabs

(8 in. x 2 in. and under 10 in. x 10 in.)

	Per Gross Ton
Pittsburgh	$31.00 to $32.00
Youngstown	31.00
Cleveland	31.00

Skelp

(F.o.b. Pittsburgh or Youngstown)

	Per Lb.
Grooved	1.70c. to 1.80c.
Universal	1.70c. to 1.80c.
Sheared	1.70c. to 1.80c.

Wire Rods

(Common soft, base)

	Per Gross Ton
Pittsburgh	$36.00
Cleveland	36.00
Chicago	37.00

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.80
Old range non-Bessemer, 51.50% iron	4.65
Mesabi Bessemer, 51.50% iron	4.65
Mesabi non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algeria	12.00c.
Iron ore, low phos., Swedish, average 68% iron	12.00c.
Iron ore, basic Swedish, average 65% iron	10.00c.
Manganese ore, washed 52% manganese, from the Caucasus	30.00c.
Manganese ore, Brazilian, African or Indian, basic 50%	30.00c.
Tungsten ore, high grade, per unit, in 60% concentrates	$14.00 to $16.50

	Per Gross Ton
Chrome ore, 45 to 50% Cr_2O_3, crude, c.i.f. Atlantic seaboard	$22.00 to $24.00

	Per Lb.
Molybdenum ore, 85% concentrates of MoS_2, delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.50
Foundry, f.o.b. Connellsville prompt	$3.25 to 4.75
Foundry, by-products, Ch'go ovens,	8.00
Foundry, by-products, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered	9.00 to 9.40
Foundry, by-product, Phila	9.00
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry by-prod., del'd St. Louis	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.25 to $1.75
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, ¾-in. f.o.b. Pa. mines	1.90 to 2.00
Mine run gas coal, f.o.b. Pa. mines	1.65 to 1.75
Steam slack, f.o.b. W. Pa. mines	90c. to 1.10
Gas slack, f.o.b. W. Pa. mines	1.00 to 1.25

Ferromanganese

	Per Gross Ton
Domestic, 80%, seaboard	$94.00 to $99.00
Foreign, 80%, Atlantic or Gulf port, duty paid	94.00 to 99.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$31.00 to $34.00
Domestic, 16 to 19%	29.00 to 32.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$83.50
75%	130.00

	Per Gross Ton Furnace		Per Gross Ton Furnace
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	39.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		Per Gross Ton
10%	$30.00	13%	$34.00
11%	32.00	14%	36.00
12%	34.00	15%	39.00

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		Per Gross Ton
6%	$21.50	11%	$24.50
7%	22.00	12%	25.50
8%	22.50	13%	26.50
9%	23.00	14%	28.50
10%	23.50	15%	31.50

Other Ferroalloys

Ferrotungsten, per lb. contained metal del'd	$1.30 to $1.40
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.15 to $3.65
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$160.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton	$91.00
Ferrophosphorus, electric 24%, f.o.b. Anniston, Ala., per gross ton	$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silicon, gravel, f.o.b. Illinois and Kentucky mines	$18.00
No. 2 lump, Illinois and Kentucky mines	20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	$18.00 to 18.50
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	32.50

Fire Clay Brick

Per 1000 f.o.b. Works

	High-Heat Duty Brick	Intermediate Heavy Duty Brick
Pennsylvania	$43.00 to $46.00	$35.00 to $38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	.....
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Grond fire clay, per ton	7.00	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00
Standard size	45.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	73
†Carriage bolts	73
Lag bolts	73
Plow bolts, Nos. 1, 2, 3 and 7 heads	73
Hot-pressed nuts, blank or tapped, square	73
Hot-pressed nuts, blank or tapped, hexagons	73
C.p.c. and t. square or hex. nuts, blank or tapped	73
Washers*	7.00c. to 6.75c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including ⅞ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagon nuts	73
Semi-finished hexagon castellated nuts, S.A.E.	73
Stove bolts in packages, P'gh	80, 10, 10 and 5
Stove bolts in packages, Chicago.	80, 10, 10 and 5
Stove bolts in packages, Cleveland.	80, 10, 10 and 5
Stove bolts in bulk, P'gh	80, 10, 10, 5 and 2½
Stove bolts in bulk, Chicago.	80, 10, 10, 5 and 2½
Stove bolts in bulk, Cleveland.	80, 10, 10, 5 and 2½
Tire bolts	60, 10 and 10

Discounts of 73 per cent off on bolts and nuts applied on carload business.

Large Rivets

(½-in. and larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$2.90
F.o.b. Chicago	3.00

Small Rivets

($\frac{7}{16}$-in. and smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70, 10 and 5
F.o.b. Cleveland	70, 10 and 5
F.o.b. Chicago	70, 10 and 5

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10, 10 and 5
Milled standard set screws, case hardened,	80 and 5
Milled headless set screws, cut thread	75 and 10
Upset hex. head cap screws, U.S.S. thread,	85 and 10
Upset hex. cap screws, S.A.E. thread	85 and 10
Upset set screws	80, 10 and 5
Milled studs	70

CHICAGO

Steel Plant Operations Decline Despite Large Plate Orders—Pig Iron Weak

CHICAGO, June 10.—Steel mill operations have dropped to a range of 75 to 80 per cent of ingot capacity. Rail mill output, which usually tapers at this time of the year, has been revised downward to 70 per cent of capacity, and further reductions will be made in the near future. Three blast furnaces have been taken out of service, one for relining and two are banked. The active list now includes 22 of 36 in this district.

Demand for structural material is below normal for this season. Bar mill products are moving forward to consumers at a rate which approximates 75 per cent of mill capacity. Plates stand out in sharp contrast when compared with other finished steel products. New orders placed at mills for plates for oil and gas line manufacture have forced operations to capacity, with schedules filled for the next two months. Orders already placed with pipe makers, but on which steel requirements have not been specified, will easily extend the period of full plate mill output for at least another month or to the approach of the fall months.

It is the large tonnage of plates purchased this week that has brought sales of finished steel products to the highest point in six weeks, and specifications have been exceeded only in three weeks so far this year. This situation lends much-needed help to a market which was sinking rather rapidly, as evidenced by the fact that miscellaneous purchases for June delivery had fallen to a point not far from the low of the year.

The implement trade, already slowed down, plans further curtailment, partly because of seasonal conditions, the approach of the mid-year inventory period and overproduction in some lines, as well as lightened demand.

The price structure for finished steel products lacks the foundation that it had a week or 10 days ago.

Ferroalloys.—This market is listless from the viewpoint of new sales. Shipments are lighter than at the beginning of the month.

Pig Iron.—The Western pig iron market is mixed from almost any angle. Northern iron is being quoted at $18.50 a ton for the base grade at local furnaces, but, when high silicons are involved, differentials are waived, giving rise to reports that the price range is upward from $18 a ton. Boat iron is reported to have been moved at as low as $16.75 a ton, Chicago, but here again there enters not only the question of shading of differentials but also the margin of profit acceptable to sellers. Iron on dock is moving freely at $17 to $18 a ton, base grade. Two thousand tons has been docked at Milwaukee and a 2500-ton cargo is due at Chicago from Cleveland. The Southern iron market is weak, with prices ranging from $12 to $12.50 a ton, Birmingham.

The silvery market is in the throes of extremely weak prices. A user in Wisconsin has taken 500 tons of the 10 per cent grade at a figure under $23 a ton, base, Jackson County, Ohio. This shipment was made by boat from Buffalo, where another cargo is being loaded. The 15 to 16 per cent grade is moving from the Mississippi River producing point by rail to Chicago and thence by boat to Saginaw, Mich.

All told, the Western pig iron market is in an unsettled condition. The melt is spotty, though shipments are holding well to the rate in May. Forward contracting is making fair progress, considering all factors.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	$18.50
N'th'n No. 1 fdy., sil. 2.25 to 2.75	19.00
Malleable, not over 2.25 sil.	18.50
High phosphorus	18.50
Lake Super. charc'l, sil. 1.50	27.04
S'th'n No. 2 fdy.	$18.01 to 18.51
Low phos., sil. 1 to 2, copper free	29.50
Silvery, sil. 8 per cent	27.29
Bess. ferrosilicon, 14-15 per cent	46.29

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Wire Products.—A summer lull has taken hold of this market, which is less active than usual at this season. One reason is that demand from the manufacturing trade is below normal. Producers are turning their eyes to the crop situation in an endeavor to picture the future as it relates to demand from rural communities and distribution through jobbers and retailers. The outlook is not unfavorable. Cool weather in the more southerly portions of the country and frosts in the more northerly sections have resulted in slow progress by practically all crops. Recently, however, there has been an increase in temperature, which in most instances, when accompanied by sufficient rain, has been beneficial.

Demand for electrical wires is steady, and the season is approaching when radio manufacturers normally draw heavily against supplies of magnet wire.

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.00c.
Reinforc'g bars, billet steel—	
30 to 500 tons	2.00c.
500 tons and over	1.85c.
Rail steel reinforcement	1.65c. to 1.75c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons	3.35c.
Flats and squares	3.85c.
Bands (1/8 in. in Nos. 10 and 12 gages)	3.20c.
Hoops (No. 14 gage and lighter)	3.75c.
Black sheets (No. 24)	4.05c.
Galv. sheets (No. 24)	4.60c.
Blue ann'l'd sheets (No. 10)	3.35c.
Spikes (5/8 in. and larger)	3.55c.
Track bolts	4.55c.
Rivets, structural	4.00c.
Rivets, boiler	4.00c.
	Per Cent Off List
Machine bolts	60 and 10
Carriage bolts	60 and 10
Coach or lag screws	60 and 10
Hot-pressed nuts, sq., tap. or blank,	60 and 10
Hot-pressed nuts, hex., tap. or blank,	60 and 10
No. 8 black ann'l'd wire, per 100 lb.	$3.45
Com. wire nails, base per keg	2.75
Cement c't'd nails, base per keg	2.85

Cold-rolled Strip.—Demand remains sluggish and little support is being given to the current low rate of production. Third quarter books have been opened at present quotations, but interest in future needs is at low ebb.

Plates.—Heavy demand for plates, most of which are to go into the manufacture of line pipe, is the backbone of the Chicago steel market. Last year, when a like peak came in demand for plates, local mills were otherwise heavily engaged, and a sizable part of the tonnage was taken by Eastern mills. In the present buying movement Chicago producers are in a more favorable position as to the arrangement of schedules and promises of deliveries. Accordingly, tonnages offered are being taken and rolling schedules are being arranged so that Chicago plate mills will operate at full capacity through June and July. Tonnages not yet added to mill books, in addition to pipe requirements which are in the making, may reasonably lead to the expectation that local plate mills will be engaged at capacity well into the fall months.

The A. O. Smith Corporation, Milwaukee, though heavily booked and on a three-shift day, is not making full use of its capacity, which is 32 miles a day of large-diameter oil and gas line pipe.

Orders for plates for tank construction amount to only a few hundred tons. Fresh inquiries include two lots of 800 tons each. The aggregate tonnage now overhanging the market is in excess of 10,000 tons.

The railroad car market remains quiet except for a few scattered inquiries of small size and the prospect that the Illinois Central will make awards of 2300 cars in the next week or 10 days. Western car shops have fair schedules for the summer months, but they view with uncertainty the period that lies beyond.

Deliveries of plates are being extended, the average now being close to 30 days.

Rails and Track Supplies.—The gradual reduction in rail backlogs is leading to a seasonal cut in rolling mill schedules. Output has been reduced about 10 points to 70 per cent of capacity. An electric line in Mis-

souri has ordered 500 tons. Specifications are in fair volume, and two railroads, which earlier in the year suspended shipments against contracts, are now entering specifications, the total of these this week having been more than 3000 tons.

New business in track supplies is light. On the other hand, specifications are in good volume and output remains at a substantial level. In fact, releases for tie plates in the week have led to a slight increase in production of this commodity. Several railroads are exerting pressure for prompt deliveries of track accessories. The light rail market is quiet both in new sales and in shipments.

Prices f.o.b. mill, per gross ton: Standard section open-hearth and Bess. rails, $43; light rails, rolled from billets, $36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.07½c. to 2.15c.; angle bars, 2.75c.

Cast Iron Pipe. — Included among awards this week is 1800 ft. of 4 to 10-in. pipe by Killbuck, Ohio; 150 tons of 24-in. by Lorain, Ohio, and 700 tons by Rogers City, Mich. Fresh inquiry is not promising. Requests for prices are out for 200 tons of 16-in. pipe for Chicago and 300 tons for a sewage disposal plant at Rockford, Ill. It is interesting to note that small inquiries are increasing in number and aggregate tonnage, while large orders are becoming scarce. Prices are steady on the general run of business.

Prices per net ton, deliv'd Chicago: Water pipe, 6-in. and over, $45 to $46; 4-in., $48 to $49; Class A and gas pipe, $3 extra.

Sheets.—Operations of local hot mills range from 50 to 55 per cent of capacity in a very spotty market. There are, however, some conditions which point to betterment. Sellers are finding less resistance to prices, which have settled to the lower quotations in instances where spreads were quoted a week ago. Galvanized sheets, delivered Chicago, are now priced at 3.35c. a lb., and No. 10 blue annealed is bringing 2.15c. Specifications from container manufacturers are lighter, but orders from this source are still one of the bright spots in the local sheet market. Sellers are in hopes that demand for roofing sheets will follow custom and increase in July.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 2.70c.; No. 24 galv., 3.35c.; No. 10 blue ann'l'd, 2.15c. Deliv'd prices at other Western points are equal to the freight from Gary, plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.

Structural Material. — Awards in the week total 8000 tons. Repairs to Chicago schools may call for 6000 tons by the time the present program is completed. The site for the Chicago Post Office is still in doubt. The addition to the National Bank of the Republic calls for 4000 tons. The Transportation Building for the World's Fair requires 2500 tons of steel, and plans will be out for another building before the end of the month. Prices quoted on fabricated material are low. Shops are hungry for work, and competition is the keenest in many months.

Steel plant operations drop to a range of 75 to 80 per cent.

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Heavy buying of plates for pipe manufacture aids demand for finished steel products.

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Pig iron market unsettled and weak as boat shipments arrive from Lake Erie ports. Silvery iron extremely weak.

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Three blast furnaces are taken out of service.

* * *

Scrap market still weak, though prices are getting to a point where speculative buying may result.

Bolts, Nuts and Rivets. — Demand for these commodities continues to taper as the farm implement manufacturing group reduces output. Prices are steady. Third quarter contracts, now being offered to buyers, are being accepted with little resistance.

Bars.—Chicago soft steel bar mills are operating in the range of 75 to 80 per cent of capacity. New specifications, coming from a wide circle of users, are supporting this rate. Farm implement manufacturers, which are now approaching the mid-year inventory period, continue to slacken their pace, though the change is less abrupt than in previous weeks. Deliveries of billet steel bars range from two to four weeks.

Orders for alloy steel bars continue to taper, and output of less than 50 per cent of capacity is probable unless demand grows. The iron bar market is unusually quiet. Demand for rail steel bars shows little change. Barn equipment manufacturers are well engaged, but the bed industry is lagging in output. Prices lack strength at 1.75c. a lb., Chicago Heights.

Reinforcing Bars — Several dealers in billet steel reinforcing bars have published prices of 1.85c a lb. for lots above 500 tons each. It is in the heavy awards that the price structure has been weak throughout the spring and early summer. Roadwork in Illinois and neighboring States continues to play an important part in the reinforcing bar market, though tonnages placed and those offered are small and scattered. The 1300 tons needed for a sewage disposal plant at Galesburg, Ill., will be fabricated in a Chicago shop. Fresh inquiries are not numerous, but architects still hold to the opinion that building construction will expand rather than diminish.

Coke. — Shipments of by-product foundry coke are averaging well up to the rate of May. The price is steady at $8 a ton, f.o.b. local ovens.

Old Material. — Prices for most grades are nominal in a market that is unusually dull. Heavy melting steel has been taken by a consumer at $12.50 a ton, delivered, and brokers are trading at $12 to $12.25 a ton. Shipments to mills are lighter, not alone because ingot output is smaller, but because some steel units are finding more pig iron available and they are using less scrap in their mixtures. The situation among foundries of all classes is spotty, and the future is uncertain.

This situation, coupled with the present low levels for scrap, is leading to a growing interest in the speculative side of the market. It is probable that any indication pointing to improvement in business in the fall would lead some users to put scrap on the ground. In fact, brokers and dealers are also beginning to look forward to the possibility of a speculative market. The Milwaukee Road is offering 1000 tons of rails, and the Oakland Motor Car Co. will sell 15 cars of scrap.

Prices deliv'd Chicago district consumers:

Per Gross Ton	
Basic Open-Hearth Grades:	
Heavy melting steel	$12.00 to $12.50
Shoveling steel	12.00 to 12.50
Frogs, switches and guards, cut apart, and misc. rails	13.00 to 13.50
Hydraul. compressed sheets	10.75 to 11.25
Drop forge flashings	9.00 to 9.50
No. 1 busheling	10.00 to 10.50
Forg'd cast and r'l'd steel carwheels	15.25 to 15.75
Railroad tires, charg. box size	15.50 to 16.00
Railroad leaf springs cut apart	15.75 to 16.25
Acid Open-Hearth Grades:	
Steel couplers and knuckles	14.00 to 14.50
Coil springs	16.00 to 16.50
Electric Furnace Grades:	
Axle turnings	11.50 to 12.00
Low phos. punchings	13.50 to 14.00
Low phos. plates, 12 in. and under	13.50 to 14.00
Blast Furnace Grades:	
Axle turnings	9.50 to 10.00
Cast iron borings	8.00 to 8.50
Short shoveling turnings	8.00 to 8.50
Machine shop turnings	6.50 to 7.00
Rolling Mill Grades:	
Iron rails	13.50 to 14.00
Rerolling rails	14.75 to 15.25
Cupola Grades:	
Steel rails, less than 3 ft.	14.25 to 14.75
Steel rails, less than 2 ft.	15.00 to 15.50
Angle bars, steel	13.50 to 14.00
Cast iron carwheels	13.50 to 14.00
Malleable Grades:	
Railroad	13.50 to 14.00
Agricultural	12.25 to 12.75
Miscellaneous:	
*Relaying rails, 56 to 60 lb.	23.00 to 25.00
*Relaying rails, 65 lb. and heav.	26.00 to 31.00
Per Net Ton	
Rolling Mill Grades:	
Iron angle and splice bars	13.50 to 14.00
Iron arch bars and transoms	15.00 to 15.50
Iron car axles	24.50 to 25.00
Steel car axles	15.50 to 16.00
No. 1 railroad wrought	10.50 to 11.00
No. 2 railroad wrought	10.75 to 11.25
No. 1 busheling	7.50 to 8.00
No. 2 busheling	6.00 to 6.50
Locomotive tires, smooth	14.50 to 15.00
Pipes and flues	8.00 to 8.50
Cupola Grades:	
No. 1 machinery cast	12.75 to 13.25
No. 1 railroad cast	11.25 to 11.75
No. 1 agricultural cast	9.50 to 10.00
Stove plate	9.50 to 10.00
Grate bars	8.50 to 9.00
Brake shoes	8.50 to 9.00

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

NEW YORK

Structural Steel Outlook More Promising—Plates Weaker—Pig Iron Dull

NEW YORK, June 10.—Little interest is being shown in pig iron for delivery in the third quarter, and doubtless considerable iron now in foundry stock piles or on order will be carried over into that period. However, inquiries for small fill-in lots are more numerous, although this gain may reflect an accumulation from Memorial Day week. Sales, at 6000 tons, are equal to those of the previous week. Blast furnace stocks are growing rather large and, since there is little inclination to reduce prices further in view of the present low level, it is likely that additional stacks will be put out.

The General Electric Co. is in the market for 1350 tons of foundry iron, of which 750 tons is for Pittsfield, Mass., 440 tons for Lynn, Mass., and 200 tons for Schenectady, N. Y. An inquiry for 1000 tons of foundry in this territory and 1200 tons for export are the only other large lots pending. The American Locomotive Co. is asking for prices on 150 tons of foundry for Schenectady, N. Y., and the Burnham Boiler Corporation is still in the market for 300 tons for Lancaster, Pa. Competition is severe, but price concessions consist chiefly of waiving silicon differentials.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	$20.91
*Buff. No. 2, del'd east. N. J.	19.28
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	19.39
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	19.89

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.

*Prices delivered to New Jersey cities having rate of $3.28 a ton from Buffalo.

Finished Steel. — Although a week ago it appeared that steel prices had attained some semblance of steadiness, further weakness has developed in plates and cold-rolled strip steel. Sales of plates have been made at 1.75c., Coatesville, and, in fact, this price seems to be more freely quoted on the attractive tonnages, which are few. Some Eastern mills are holding for a minimum of 1.80c., Coatesville. Concessions have appeared from 2.45c., Pittsburgh or Cleveland, on cold-rolled strip steel. Some of the mills, particularly those making sheets, have named present prices as the minimum for the third quarter, which is the first formal attempt at price stabilization.

Business is dull in most lines except pipe and structural steel. In the latter, the outlook for a rising volume of awards appears especially favorable. The trend upward began in May, according to the Structural Steel Board of Trade of New York, which estimates the total lettings in the metropolitan district in May at 55,000 tons, of which 43,000 tons was booked by its members. This compares with 28,000 tons in April, which made the poorest showing, and 38,000 tons in March. Shops of members of the structural board are well engaged and have sufficient tonnage on their books to maintain a good rate of operation for four or five months. Nearly all members are employing full personnel in fabricating and erection.

Reinforcing Bars.—Lettings are unusually light, although considerable tonnage is pending. The reinforcing for municipal pier No. 34, North River, amounting to 1800 tons, is expected to be placed this week. Mill prices on current tonnages, which have been small, range from 1.80c. to 1.85c., Pittsburgh.

Concrete bars in 40, 50 and 60-ft. lengths for mill shipment are quoted at 1.75c. to 1.85c. a lb., base Pittsburgh. Warehouse prices range from 2.44c. a lb., f.o.b. cars, New York, for carloads or larger lots to 3.25c. for the smallest tonnages.

Warehouse Business.—Buying has improved since the beginning of the month, but orders are still small. Demand for galvanized sheets is larger, and the low prices of a few weeks ago have disappeared, so that 4.25c. a lb., base, is generally representative of the market. A fair volume of structural steel is moving from stock, and prices are being maintained with only occasional concessions on desirable orders.

Cast Iron Pipe.—Tonnages of pressure pipe continue small, but prices are being maintained at about $37 a net ton, f.o.b. Northern foundry. The Rensselaer Water Co., Rensselaer, N. Y., reported last week to be in the market for 200 to 300 tons, will buy upward of 500 tons of pipe. The United States Engineering Co., New York, has closed on 250 tons of centrifugal pipe for North Grafton, Mass., with R. D. Wood & Co. Operations of Northern foundries continue at about 75 per cent of capacity, although no large tonnages of pipe have been awarded in recent weeks.

Prices per net ton deliv'd New York: Water pipe, 6-in. and larger, $39.90 to $40.90; 4-in. and 5-in., $42.90 to $43.90; 3-in., $49.90 to $50.90. Class A and gas pipe, $3 extra.

Coke.—The furnace coke market still shows a wide range of prices, with certain operations in the Connellsville district quoting $2.60 to $2.75 a net ton, and others offering standard grade at $2.40 to $2.50 a ton. Foundry coke prices are as follows:

Special brands of beehive foundry coke, $4.85 a net ton, ovens, or $8.56 delivered to northern New Jersey, Jersey City and Newark, and $9.44 to New York and Brooklyn; by-product foundry coke, $9 to $9.40, Newark or Jersey City; $10.06, New York or Brooklyn.

Old Material. — Although buying prices of scrap show no further recession this week, the market lacks firmness, and a renewal of consumer buying in eastern Pennsylvania might bring further concessions. Foundry stove plate has been sold at $10 a ton, delivered to consumers in New Jersey, and dealers are offering further tonnages at 50c. a ton less.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel	$9.50 to $10.50
Heavy melting steel (yard)	6.50 to 7.00
No. 1 hvy. breakable cast	8.50 to 9.00
Stove plate (steel works)	6.50
Locomotive grate bars	7.00 to 7.50
Machine shop turnings	5.50 to 6.00
Short shoveling turnings	5.50 to 6.00
Cast borings (blast fur. or steel works)	6.50
Mixed borings and turnings	5.00
Steel car axles	17.00
Iron car axles	19.50 to 20.00
Iron and steel pipe (1 in. dia., not under 2 ft. long)	8.25 to 8.50
Forge fire	8.00
No. 1 railroad wrought	10.00 to 10.50
No. 1 yard wrought, long	9.00 to 9.50
Rails for rolling	10.00 to 10.50
Stove plate (foundry)	8.00
Malleable cast (railroad)	10.50 to 11.00
Cast borings (chemical)	9.00 to 9.50

Prices per gross ton, deliv'd local foundries:

No. 1 machry. cast	$15.00
No. 1 hvy. cast (columns, bldg. materials, etc.); cupola size	13.00
No. 2 cast (radiators, cast boilers, etc.)	12.50

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.30c.
Soft steel bars, small shapes	3.25c.
Iron bars	3.24c.
Iron bars, Swed. charcoal	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons	3.40c.
Flats and squares	3.90c.
Cold-roll. strip, soft and quarter hard	4.95c.
Hoops	4.25c.
Bands	3.75c.
Blue ann'l'd sheets (No. 10)	3.40c. to 3.60c.
Black sheets (No. 24*)	3.80c. to 4.00c.
Galvanized sheets (No. 24*)	4.25c. to 4.50c.
Long terne sheets (No. 24)	5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galv. annealed	5.15c.
Tire steel, ½ x ½ in. and larger	3.40c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.75c.
Open-hearth spring steel, bases	4.50c. to 7.00c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

	Per Cent Off List
Machine bolts, cut thread:	
¾ x 6 in. and smaller	60
1 x 30 in. and smaller	50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	60
¾ x 20 in. and smaller	50 to 50 and 10
Boiler Tubes—	Per 100 Ft.
Lap welded, 2-in.	$19.00
Seamless steel, 2-in.	20.25
Charcoal iron, 2-in.	26.25
Charcoal iron, 4-in.	67.00

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	$6.45	$6.20
Charcoal, per Box—	A	AAA
IC	$9.70	$12.10
IX	12.00	14.25
IXX	13.90	16.00

PHILADELPHIA

Steel Consumers More Active But Their Requirements Are Small

PHILADELPHIA, June 10.—Some steel consuming industries in this district are increasing output, but their steel requirements are still small. One of the three leading radio manufacturers is producing about 1800 sets a day, and the other two makers have recently been buying small lots of electrical and deep-drawing sheets, preparatory to beginning their production programs for the season. A manufacturer of automatic gas heaters is maintaining a high rate of operation and pressing for prompt delivery of sheets and other materials.

While shipyards are executing some sizable contracts, they are reserving space for vessels still to be awarded, and this has resulted in the rejection of certain small contracts and repair work. The eastern Pennsylvania yards equipped for handling large work did not bid for repairs on four vessels of the Roosevelt Steamship Co., requiring about 3500 tons of plates. This was disappointing to the plate mills near here, which do not, as a rule, participate in plate tonnage for new vessels where shapes are also required.

Pig Iron.—Foundry operations in eastern Pennsylvania are irregular, with a number of plants on a four-day week. As a result, pig iron buying is limited to small lots for prompt shipment, as most consumers have little or no stock. Prices are unchanged, with foundry grade quoted at $19 to $19.50 a ton, base, by Northern furnaces and $12.50 a ton, Birmingham, by Southern makers. Restricted operations of steel mills have curtailed buying of basic iron, so that the price is unchanged in the absence of transactions. A Coatesville, Pa., mill has closed on about 500 tons of Bessemer iron with an eastern Pennsylvania producer.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	$19.76 to $20.26
East. Pa. No. 2X, 2.25 to 2.75 sil.	20.26 to 20.76
East. Pa. No. 1X	20.76 to 21.26
Basic (del'd east. Pa.)	18.75 to 19.00
Malleable	21.25
Stand. low phos. (f.o.b. east. Pa. furnace)	24.00
Cop. b'r'g low phos. (f.o.b. furnace)	23.00 to 24.00
Va. No. 2 plain, 1.75 to 2.25 sil.	22.29
Va. No. 2X, 2.25 to 2.75 sil.	22.79

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $4.54 from Virginia furnaces.

Bars.—The quotation is unchanged at 1.75c. a lb., Pittsburgh, or 2.04c., delivered Philadelphia.

Reinforcing Bars.—Reinforced concrete projects continue small and prices of bars are unchanged at 1.80c. to 1.85c. a lb., Pittsburgh, or 2.09c. to 2.14c., delivered Philadelphia, for billet steel bars. Rail steel bars are 1.65c. to 1.70c., Franklin, Pa., or 1.94c. to 1.99c., delivered Philadelphia, with no extra for cutting to length or bending.

Plates.—Mills are operating at from 50 to 60 per cent of rated capacity in their rolling departments, but ingot production is at a lower level. The price is unchanged at 1.80c. a lb., Coatesville, Pa., or 1.90½c., delivered Philadelphia, with concessions of $1 a ton to 1.75c., Coatesville, Pa., usually granted on desirable tonnages or when plate and shape orders are combined.

Shapes.—Fabricating shops are well engaged, but are not quoting on a very large tonnage of new business. While most of the current orders are being placed at 1.70c. to 1.75c. a lb., f.o.b. nearest mill to consumer, or 1.76c. to 1.81c., delivered Philadelphia, the larger tonnages of shapes are being taken by mills at concessions of $1 a ton and more from 1.70c., mill.

Sheets.—Consumers in certain fields of manufacture are increasing their production, but this has not been appreciably reflected in larger sales of sheets. Consequently, mills are in need of tonnage, and competition for small orders continues keen. Blue annealed sheet prices are unchanged at 2.15c. a lb., Pittsburgh, or 2.44c., delivered Philadelphia, for No. 13 gage, with 2c., Pittsburgh, or 2.29c., Philadelphia, quoted to automobile manufacturers. Blue annealed plates, No. 10 gage, are quoted at 2c., Pittsburgh, or 2.29c., Philadelphia, to ordinary consumers, and at 1.80c., Pittsburgh, or 2.09c., Philadelphia, to car builders and other preferred buyers. Black sheets are unchanged at 2.55c., Pittsburgh, or 2.84c., Philadelphia, although high-finished sheets are still being figured on a basis of 2.50c. Galvanized sheets still show some tendency to weakness, so that the market is quotable at 3.15c. to 3.20c., Pittsburgh, or 3.44c. to 3.49c., Philadelphia.

Imports.—In the week ended June 7, 6596 tons of ore arrived at this port, of which 3093 tons was chrome ore from Cuba, 2000 tons chrome ore from Portuguese Africa, 1003 tons iron ore from Germany, and 500 tons manganese ore from Java. Pig iron arrivals consisted of 2872 tons from British India. Steel imports were 263 tons of steel strips and five tons of structural shapes from France, 65 tons of structural shapes and 24 tons of steel bars from Belgium and eight tons of steel bars from the United Kingdom.

Old Material.—With mill operations greatly restricted, consumers are able to obtain sufficient scrap by purchasing small distress lots. A Coatesville, Pa., mill is reported to have closed on upward of 2000 tons of No. 1 heavy melting steel at slightly more than $13 a ton, and a Claymont, Del., consumer has bought a few hundred tons of No. 1 steel in carload lots at $12.50 a ton, delivered. Other grades are quiet, and prices are unchanged.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	$13.00 to $13.50
No. 2 heavy melting steel	11.00 to 11.50
Heavy melting steel (yard)	10.25 to 10.75
No. 1 railroad wrought	15.00 to 15.50
Bundled sheets (for steel works)	9.50 to 10.00
Hydraulic compressed, new	12.00 to 12.50
Hydraulic compressed, old	10.00
Machine shop turnings (for steel works)	9.50
Heavy axle turnings (or equiv.)	11.50 to 12.00
Cast borings (for steel works and roll. mill)	10.00
Heavy breakable cast (for steel works)	12.50 to 13.00
Railroad grate bars	10.50
Stove plate (for steel works)	10.50
No. 1 low phos., hvy., 0.04% and under	20.00
Couplers and knuckles	18.00 to 18.50
Rolled steel wheels	18.00 to 18.50
No. 1 blast f'nace scrap	8.50 to 9.00
Wrot. iron and soft steel pipes and tubes (new specific.)	12.50
Shafting	18.00 to 18.50
Steel axles	21.00 to 21.50
No. 1 forge fire	12.00 to 12.50
Cast iron carwheels	14.50 to 15.00
No. 1 cast	14.00 to 14.50
Cast borings (for chem. plant)	13.50 to 14.00
Steel rails for rolling	15.00 to 15.50

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.70c.
Plates, ⅜-in.	2.90c.
Structural shapes	2.70c.
Soft steel bars, small shapes, iron bars (except bands)	2.80c.
Reinforc. steel bars, sq., twisted and deform.	2.60c. to 2.80c.
Cold-fin. steel, rounds and hex.	3.40c.
Cold-fin. steel, sq. and flats	3.90c.
Steel hoops	3.55c.
Steel bands, No. 12 to ⅛-in. inclus.	3.30c.
Spring steel	5.00c.
*Black sheets (No. 24)	3.80c.
†Galvanized sheets (No. 24)	4.25c.
Light plates, blue annealed (No. 10)	3.25c.
Blue ann'l'd sheets (No. 13)	3.40c.
Diam. pat. floor plates, ¼-in.	5.30c.
Swedish iron bars	6.60c.

*For 50 bundles or more; 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more; 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

Ryan, Scully & Co., 3711 Wissahickon Avenue, Philadelphia, have received an order from the Penn Brass & Copper Co., Erie, Pa., for two annealing furnaces, one of the conveyor type of special design for the annealing of brass and copper tubes and the other for the bright annealing of copper tubing at definite temperatures.

CLEVELAND

Steel Plant Operations Decline to 64 Per Cent as Orders Dwindle

CLEVELAND, June 10.—Demand for finished steel is showing a slightly downward tendency in practically all products. Orders are confined to small lots for early shipment. There has been a further slowing down in operations by Cleveland steel plants, two open-hearth furnaces having been shut down this week. Local plants are now operating at 64 per cent of capacity, as compared with 70 per cent a week ago.

Orders from the automotive industry are not holding up to recent volume, and the production of motor cars during June is expected to show a moderate falling off as compared with May. Automobile manufacturers and parts makers are placing steel only for their early needs. Buyers, as a rule, are taking no interest in third quarter contracts and, in view of the present price situation, mills are showing no eagerness to name prices and take on tonnage for the coming quarter. Changes in prices for the next quarter do not seem probable.

On current orders, there is still considerable pressure on the part of the automotive industries to secure further price concessions, and these are succeeding in some cases. Hot-rolled strip has declined $1 a ton to good-lot buyers, but mills are endeavoring to maintain recent prices for small-lot consumers. Semi-finished steel again has settled to $31, Cleveland and Youngstown, for sheet bars, billets and slabs.

Pig Iron.—Sales were in moderate volume the past week. Demand for small lots for prompt shipment has increased, as some consumers have taken all the iron due on old contracts and are making additional purchases to carry them through the remainder of the current quarter. Sales by Cleveland interests aggregated 8000 tons. A few third quarter contracts were closed, including one from a Dayton melter for 1000 tons of foundry iron. A 3000-ton cargo of iron was shipped from Cleveland to Chicago, this having been the first water shipment from this port this season. Shipments this month have held to the rate of the corresponding period in May.

Prices are holding to recent quotations. The recent 50c a ton reduction in Chicago so far has not affected prices in Indiana and Michigan, where they had previously been marked down. Locally, the market is firm at $18.50, furnace, for foundry and malleable iron for Cleveland delivery. For outside shipment, $18 is asked but might be shaded for delivery to competitive points. These grades are quoted at $18 to $18.50 in northern Indiana and $19 in Michigan.

Prices per gross ton at Cleveland:

N'th'n fdy., sil. 1.75 to 2.25	$18.50
S'th'n fdy., sil. 1.75 to 2.25	19.51
Malleable	18.50
Ohio silvery, 8 per cent	28.00
Basic Valley furnace	18.50
Stand. low phos., Valley	$26.50 to 27.00

Prices are f.o.b. furnace except on Southern foundry and silvery iron. Freight rates: 50c. average local switching charge; $3 from Jackson, Ohio; $6.01 from Birmingham.

Semi-finished Steel.—After wavering for a week or two between $32 and $31, the market has settled to the lower price at Cleveland and Youngstown for sheet bars, billets and slabs. The local producer is now billing shipments against contracts at $31, which price is said to have developed in the Youngstown district. Orders for sheet bars have declined, owing to the slack demand for auto body sheets, and other semi-finished material is dull.

Iron Ore.—Shipments of Lake Superior ore from Lake Erie ports during May were 3,303,766 tons, as compared with 5,053,838 tons during the same month last year. Shipments from these ports for the season until June 1 were 4,074,228 tons, as against 6,730,494 tons during the corresponding period last year. Dock balance June 1 amounted to 4,252,790 tons, as against 3,871,191 tons on the same date a year ago.

Strip Steel.—Weakness has again developed in the hot-rolled strip market, with concessions of $1 a ton on car lots or to 1.65c. for wide material and 1.75c for narrow. Demand continues slow. Cold-rolled strip remains quiet. While orders from the automotive industry are very light, some mills are taking a moderate volume of business from other consumers. The price is well maintained at a minimum of 2.45c., Cleveland.

Bars, Plates and Shapes.—Orders for these products continue light, and business with some of the mills has been slightly less so far this month than during the corresponding period of May. While no structural awards of size were placed here during the week, several jobs were let in Detroit, Toledo and Youngstown, aggregating more than 6000 tons. Steel bars are rather commonly quoted at 1.75c., Cleveland, for outside shipment, but 1.80c. is still the ruling price for local delivery. Plates and shapes are steady at 1.70c., Pittsburgh.

Sheets.—Demand continues slow for all grades and, with the keenly competitive situation, the maintenance of recent prices is difficult. Concessions to 2.45c., Pittsburgh, have appeared on black sheets, although most mills are adhering to 2.55c. Some mills have quoted the latter price on a 1200-ton inquiry for the third quarter. One mill is quoting black sheets at 2.55c. and the present prices on blue annealed sheets for the third quarter, but other producers have not yet announced prices for that delivery. Pressure is being exercised to secure further concessions from 3.70c. on auto body sheets and, while there are reports of shading to 3.60c., these have not been confirmed. Blue annealed and galvanized sheets are holding to recent prices.

Reinforcing Bars.—Contract for bars for the Lorain Central bridge, Cleveland, requiring 1300 tons, has been placed with the Lowensohn Construction Co. The steel probably will be supplied by a Cleveland mill, although it has not yet been placed. Awards include 475 tons for a local warehouse.

Old Material.—Prices have declined 25c a ton on compressed sheet steel and on No. 1 busheling and the market generally has a weak tone. There is no new buying by local mills, but considerable scrap is coming to a Cleveland consumer by boat from Detroit under recent contract. Local dealers report some demand from the Youngstown district, where they are making sales of heavy melting steel to dealers at $15.25 to $15.50.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$12.00 to $12.50
No. 2 heavy melting steel	11.75 to 12.00
Compressed sheet steel	12.25 to 12.50
Light bundled sheet stampings	11.00 to 11.50
Drop forge flashings	10.50 to 11.00
Machine shop turnings	8.50 to 9.00
Short shoveling turnings	10.00 to 10.50
No. 1 railroad wrought	13.00 to 13.50
No. 2 railroad wrought	14.00 to 14.50
No. 1 busheling	11.75 to 12.00
Pipes and flues	9.00 to 9.50
Steel axle turnings	12.50 to 13.00
Acid Open-Hearth Grades:	
Low phos., forging crops	17.75 to 18.00
Low phos., billet bloom and slab crops	18.50 to 18.75
Low phos., sheet bar crops	18.00 to 18.50
Low phos., plate scrap	18.00 to 18.50
Blast Furnace Grades:	
Cast iron borings	9.50 to 9.75
Mixed borings and short turnings	9.50 to 9.75
No. 2 busheling	8.75 to 9.00
Cupola Grades:	
No. 1 cast	15.00 to 15.50
Railroad grate bars	11.00 to 12.00
Stove plate	12.00 to 12.50
Rails under 3 ft	18.50 to 19.50
Miscellaneous:	
Rails for rolling	16.25 to 16.50
Railroad malleable	16.00 to 16.50

Prices on Radiation Cut

The American Radiator Co. has reduced prices on radiation and boilers an average of 12 per cent. In addition, differentials between different heights of radiators have been wiped out.

PACIFIC COAST

Prices Hold Fairly Firm in Spite of a Slow Demand for Steel

SAN FRANCISCO, June 7, (*By Air Mail*).—With four exceptions, steel awards were in lots of less than 100 tons. Demand generally is not heavy. State, county and municipal work is slow in coming forth. The price structure is being well maintained.

The most important project of the week involved 1100 tons of structural shapes for an office building at 610 South Hill Street, Los Angeles, booked by the McClintic-Marshall Co.

Reinforcing steel bar awards this week totaled 550 tons and included 250 tons for Claremont, Cal., 200 tons for an office building in Los Angeles and 100 tons for a bridge in Washington. Bids were opened this week on 900 tons for approaches to the Lake Union bridge, Seattle, and on 350 tons for a hospital at Stanford, Cal. New inquiries include 315 tons for highway work in San Diego County, Cal., and 300 tons for a hotel addition in Pasadena. In the Los Angeles district 2.40c., base, on carload lots applies on out-of-stock material. San Francisco district quotations are $2 a ton higher.

No awards of importance were noted in the plate market. The Shell Oil Co., San Francisco has an inquiry out for several hundred tons for various pipe and tank work for a new chemical plant. Bids will be opened next week on 2000 tons for siphons at Vale, Ore. Plate prices continue fairly firm at 2.25c., c.i.f.

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and struc. shapes	2.45c. to 2.95c.
Soft steel bars	2.40c. to 2.95c.
Black sheets (No. 24)	3.65c. to 4.30c.
Blue ann'l'd sheets (No. 10)	3.05c. to 3.55c.
Galv. sheets (No. 24)	4.30c. to 4.80c.
Struc. rivets, ½-in. and larger	5.65c.
Com. wire nails, base per keg	$3.40
Cement c't'd nails, 100 lb. keg	3.40

Structural steel demand is not large. The Consolidated Steel Corporation took 450 tons for a telephone building at Long Beach. Important projects pending, upon which bids were opened this week, include 615 tons for a bridge over the Salinas River, Cal., for the State and 566 tons for a bridge over the same river for Monterey County. Plain material is firm at 2.35c., c.i.f.

Pig Iron.—Prices are unchanged.

Prices per gross ton at San Francisco:

*Utah basic	$25.00 to $26.00
*Utah fdy., sil. 2.75 to 3.25	25.00 to 26.00
**Indian fdy., sil. 2.75 to 3.25	25.00 to 26.00

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Cast Iron Pipe.—For the third time this year, awards of cast iron pipe totaled less than 100 tons. San Francisco will open bids June 9 on 265 tons of 12 and 16-in. pipe. Fullerton, Cal., opened bids this week on 110 tons of 4 to 8-in. pipe. Inquiries are slow.

BOSTON

New England Pig Iron Melt Decreasing—Heavy Melting Scrap Firmer

BOSTON, June 10.—Pig iron sales the past week again fell short of 2000 tons, and were about evenly divided between Buffalo district and east of Buffalo furnaces. Some Buffalo stacks continue to waive the 50c. a ton differential on No. 2X iron. A test of prices may come with the purchase of 1140 tons by the General Electric Co., 750 tons for its Pittsfield, Mass., foundry and 440 tons for Lynn, Mass.; June, July and August delivery is specified. The New England melt of iron is deceasing and is now down to around 35 per cent of capacity, contrasted with 40 to 45 per cent a month or so ago.

Foundry iron prices per gross ton deliv'd to most New England points:

†Buffalo, sil. 1.75 to 2.25	$20.28 to $21.28
†Buffalo, sil. 2.25 to 2.75	20.78 to 21.78
*Buffalo, sil. 1.75 to 2.25	20.91 to 21.91
*Buffalo, sil. 2.25 to 2.75	21.41 to 22.41
Va., sil. 1.75 to 2.25	25.21
Va., sil. 2.25 to 2.75	25.71
*Ala., sil. 1.75 to 2.25	22.61
*Ala., sil. 2.25 to 2.75	23.11
†Ala., sil. 1.75 to 2.25	18.75
†Ala., sil. 2.25 to 2.75	19.25

Freight rates: $4.91 all rail and $4.28 rail and water from Buffalo; $5.21 all rail from Virginia; $9.61 all rail from Alabama and $5.75 rail and water from Alabama to New England seaboard.
*All rail rate.
†Rail and water rate.

Cast Iron Pipe.—Nashua, N. H., has awarded 100 tons of 6, 8 and 12-in. pipe to the Donaldson Iron Co. Fitchburg, Mass., has placed 250 tons of 6 and 12-in. Business otherwise was placed privately, but it is intimated that the aggregate tonnage was quite large. Providence, R. I., will close bids June 16 on cement-lined pipe. Foundries are openly quoting 6-in. and larger pipe at $36 to $37 a ton, on cars foundry.

Reinforcing Bars.—Reported sales the past week totaled less than 400 tons in small lots. Billet steel bars are: One to 5-ton lots, 3.06½c. a lb., base, from stock; 5 to 99 tons, 2.56½c., 100 tons and larger lots 2.46½c. The market for rail steel bars is quiet at 2.26½c. a lb., base, delivered common Boston freight rate points.

Coke.—Approximately 95 per cent of the New England foundries have contracted for their last half fuel requirements.

Old Material.—The firmer Pittsburgh market for No. 1 heavy melting steel is reflected to some extent in this district, but prices for most other grades are still unsettled, and in a number of instances lower than they were a week ago. Even at the slightly better heavy melting steel prices, owners are reluctant to sell, and in many cases are not doing so unless ready cash is required. Brokers' ideas as to long bundled skeleton prices are rather far apart, ranging from $6 to $7 a ton.

A steamer will load 2000 tons of steel here the latter part of June for export to Japan.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$8.50 to $9.25
Scrap T rails	8.50 to 8.75
Scrap girder rails	7.00 to 7.25
No. 1 railroad wrought	8.50 to 9.00
Machine shop turnings	4.00 to 4.25
Cast iron borings (steel works and rolling mill)	4.00 to 4.50
Bundled skeleton, long	6.00 to 7.00
Forge flashings	7.00 to 7.50
Blast furnace borings and turnings	4.00 to 4.10
Forge scrap	7.00 to 7.50
Shafting	12.50 to 13.00
Steel car axles	15.50 to 16.00
Wrought pipe, 1 in. in diameter (over 2 ft. long)	7.00 to 7.50
Rails for rolling	9.00 to 9.50
Cast iron borings, chemical	9.00 to 9.25
Prices per gross ton deliv'd consumers' yards:	
Textile cast	$11.00 to $12.50
No. 1 machinery cast	14.00 to 14.50
No. 2 machinery cast	12.50 to 13.00
Stove plate	10.00 to 10.50
Railroad malleable	15.00 to 15.50

Bar Iron Wage Agreement Renewed, One Change

The Western Bar Iron Association has renewed the annual wage agreement with the Amalgamated Association of Iron, Steel and Tin Workers with one important change. The guaranteed minimum on a $1.90 card has been eliminated from the new agreement, and workers return to a sliding scale when the average price of bar iron falls below $1.90 per 100 lb., during a 60-day period covered by the bimonthly examination of sales sheets. The current tonnage rate in the bar iron division is based on a $1.90 card rate.

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars, small shapes	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway rounds	6.60c.
Norway squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tie steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold-rolled steel—	
Rounds and hex	*3.55c. to 5.55c.
Squares and flats	*4.05c. to 7.05c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.50c.

	Per Cent Off List
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot-pressed nuts	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

*Including quantity differentials.

CLEVELAND

Steel Plant Operations Decline to 64 Per Cent as Orders Dwindle

CLEVELAND, June 10.—Demand for finished steel is showing a slightly downward tendency in practically all products. Orders are confined to small lots for early shipment. There has been a further slowing down in operations by Cleveland steel plants, two open-hearth furnaces having been shut down this week. Local plants are now operating at 64 per cent of capacity, as compared with 70 per cent a week ago.

Orders from the automotive industry are not holding up to recent volume, and the production of motor cars during June is expected to show a moderate falling off as compared with May. Automobile manufacturers and parts makers are placing steel only for their early needs. Buyers, as a rule, are taking no interest in third quarter contracts and, in view of the present price situation, mills are showing no eagerness to name prices and take on tonnage for the coming quarter. Changes in prices for the next quarter do not seem probable.

On current orders, there is still considerable pressure on the part of the automotive industries to secure further price concessions, and these are succeeding in some cases. Hot-rolled strip has declined $1 a ton to good-lot buyers, but mills are endeavoring to maintain recent prices for small-lot consumers. Semi-finished steel again has settled to $31, Cleveland and Youngstown, for sheet bars, billets and slabs.

Pig Iron.—Sales were in moderate volume the past week. Demand for small lots for prompt shipment has increased, as some consumers have taken all the iron due on old contracts and are making additional purchases to carry them through the remainder of the current quarter. Sales by Cleveland interests aggregated 8000 tons. A few third quarter contracts were closed, including one from a Dayton melter for 1000 tons of foundry iron. A 3000-ton cargo of iron was shipped from Cleveland to Chicago, this having been the first water shipment from this port this season. Shipments this month have held to the rate of the corresponding period in May.

Prices are holding to recent quotations. The recent 50c a ton reduction in Chicago so far has not affected prices in Indiana and Michigan, where they had previously been marked down. Locally, the market is firm at $18.50, furnace, for foundry and malleable iron for Cleveland delivery. For outside shipment, $18 is asked but might be shaded for delivery to competitive points. These grades are quoted at $18 to $18.50 in northern Indiana and $19 in Michigan.

Prices per gross ton at Cleveland:

N'th'n fdy., sil. 1.75 to 2.25	$18.50
S'th'n fdy., sil. 1.75 to 2.25	19.51
Malleable	18.50
Ohio silvery, 8 per cent	28.00
Basic Valley furnace	18.50
Stand. low phos., Valley	$26.50 to 27.00

Prices are f.o.b. furnace except on Southern foundry and silvery iron. Freight rates: 50c. average local switching charge; $3 from Jackson, Ohio; $6.01 from Birmingham.

Semi-finished Steel.—After wavering for a week or two between $32 and $31, the market has settled to the lower price at Cleveland and Youngstown for sheet bars, billets and slabs. The local producer is now billing shipments against contracts at $31, which price is said to have developed in the Youngstown district. Orders for sheet bars have declined, owing to the slack demand for auto body sheets, and other semi-finished material is dull.

Iron Ore.—Shipments of Lake Superior ore from Lake Erie ports during May were 3,303,766 tons, as compared with 5,053,838 tons during the same month last year. Shipments from these ports for the season until June 1 were 4,074,228 tons, as against 6,730,494 tons during the corresponding period last year. Dock balance June 1 amounted to 4,252,790 tons, as against 3,871,191 tons on the same date a year ago.

Strip Steel.—Weakness has again developed in the hot-rolled strip market, with concessions of $1 a ton on car lots or to 1.65c. for wide material and 1.75c for narrow. Demand continues slow. Cold-rolled strip remains quiet. While orders from the automotive industry are very light, some mills are taking a moderate volume of business from other consumers. The price is well maintained at a minimum of 2.45c., Cleveland.

Bars, Plates and Shapes.—Orders for these products continue light, and business with some of the mills has been slightly less so far this month than during the corresponding period of May. While no structural awards of size were placed here during the week, several jobs were let in Detroit, Toledo and Youngstown, aggregating more than 6000 tons. Steel bars are rather commonly quoted at 1.75c., Cleveland, for outside shipment, but 1.80c. is still the ruling price for local delivery. Plates and shapes are steady at 1.70c., Pittsburgh.

Sheets.—Demand continues slow for all grades and, with the keenly competitive situation, the maintenance of recent prices is difficult. Concessions to 2.45c., Pittsburgh, have appeared on black sheets, although most mills are adhering to 2.55c. Some mills have quoted the latter price on a 1200-ton inquiry for the third quarter. One mill is quoting black sheets at 2.55c. and the present prices on blue annealed sheets for the third quarter, but other producers have not yet announced prices for that delivery. Pressure is being exercised to secure further concessions from 3.70c. on auto body sheets and, while there are reports of shading to 3.60c., these have not been confirmed. Blue annealed and galvanized sheets are holding to recent prices.

Reinforcing Bars.—Contract for bars for the Lorain Central bridge, Cleveland, requiring 1300 tons, has been placed with the Lowensohn Construction Co. The steel probably will be supplied by a Cleveland mill, although it has not yet been placed. Awards include 475 tons for a local warehouse.

Old Material.—Prices have declined 25c a ton on compressed sheet steel and on No. 1 busheling and the market generally has a weak tone. There is no new buying by local mills, but considerable scrap is coming to a Cleveland consumer by boat from Detroit under recent contract. Local dealers report some demand from the Youngstown district, where they are making sales of heavy melting steel to dealers at $15.25 to $15.50.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$12.00 to $12.50
No. 2 heavy melting steel	11.75 to 12.00
Compressed sheet steel	12.25 to 12.50
Light bundled sheet stampings	11.00 to 11.50
Drop forge flashings	10.50 to 11.00
Machine shop turnings	8.50 to 9.00
Short shoveling turnings	10.00 to 10.50
No. 1 railroad wrought	13.00 to 13.50
No. 2 railroad wrought	14.00 to 14.50
No. 1 busheling	11.75 to 12.00
Pipes and flues	9.00 to 9.50
Steel axle turnings	12.50 to 13.00
Acid Open-Hearth Grades:	
Low phos., forging crops	17.75 to 18.00
Low phos., billet bloom and slab crops	18.50 to 18.75
Low phos., sheet bar crops	18.00 to 18.50
Low phos., plate scrap	18.00 to 18.50
Blast Furnace Grades:	
Cast iron borings	9.50 to 9.75
Mixed borings and short turnings	9.50 to 9.75
No. 2 busheling	8.75 to 9.00
Cupola Grades:	
No. 1 cast	15.00 to 15.50
Railroad grate bars	11.00 to 12.00
Stove plate	12.00 to 12.50
Rails under 3 ft.	18.50 to 19.50
Miscellaneous:	
Rails for rolling	16.25 to 16.50
Railroad malleable	16.00 to 16.50

Prices on Radiation Cut

The American Radiator Co. has reduced prices on radiation and boilers an average of 12 per cent. In addition, differentials between different heights of radiators have been wiped out.

PACIFIC COAST

Prices Hold Fairly Firm in Spite of a Slow Demand for Steel

SAN FRANCISCO, June 7, (*By Air Mail*).—With four exceptions, steel awards were in lots of less than 100 tons. Demand generally is not heavy. State, county and municipal work is slow in coming forth. The price structure is being well maintained.

The most important project of the week involved 1100 tons of structural shapes for an office building at 610 South Hill Street, Los Angeles, booked by the McClintic-Marshall Co.

Reinforcing steel bar awards this week totaled 550 tons and included 250 tons for Claremont, Cal., 200 tons for an office building in Los Angeles and 100 tons for a bridge in Washington. Bids were opened this week on 900 tons for approaches to the Lake Union bridge, Seattle, and on 350 tons for a hospital at Stanford, Cal. New inquiries include 315 tons for highway work in San Diego County, Cal., and 300 tons for a hotel addition in Pasadena. In the Los Angeles district 2.40c., base, on carload lots applies on out-of-stock material. San Francisco district quotations are $2 a ton higher.

No awards of importance were noted in the plate market. The Shell Oil Co., San Francisco has an inquiry out for several hundred tons for various pipe and tank work for a new chemical plant. Bids will be opened next week on 2000 tons for siphons at Vale, Ore. Plate prices continue fairly firm at 2.25c., c.i.f.

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and struc. shapes..	2.45c. to 2.95c.
Soft steel bars	2.40c. to 2.95c.
Black sheets (No. 24).....	3.65c. to 4.30c.
Blue ann'l'd sheets (No. 10)	3.05c. to 3.55c.
Galv. sheets (No. 24).....	4.30c. to 4.80c.
Struc. rivets, ½-in. and larger.....	5.65c.
Com. wire nails, base per keg.....	$3.40
Cement c't'd nails, 100 lb. keg.....	3.40

Structural steel demand is not large. The Consolidated Steel Corporation took 450 tons for a telephone building at Long Beach. Important projects pending, upon which bids were opened this week, include 615 tons for a bridge over the Salinas River, Cal., for the State and 566 tons for a bridge over the same river for Monterey County. Plain material is firm at 2.35c., c.i.f.

Pig Iron.—Prices are unchanged.

Prices per gross ton at San Francisco:

*Utah basic	$25.00 to $26.00
*Utah fdy., sil. 2.75 to 3.25	25.00 to 26.00
**Indian fdy., sil. 2.75 to 3.25	25.00 to 26.00

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Cast Iron Pipe.—For the third time this year, awards of cast iron pipe totaled less than 100 tons. San Francisco will open bids June 9 on 265 tons of 12 and 16-in. pipe. Fullerton, Cal., opened bids this week on 110 tons of 4 to 8-in. pipe. Inquiries are slow.

grades are still unsettled, and in a number of instances lower than they were a week ago. Even at the slightly better heavy melting steel prices, owners are reluctant to sell, and in many cases are not doing so unless ready cash is required. Brokers' ideas as to long bundled skeleton prices are rather far apart, ranging from $6 to $7 a ton.

A steamer will load 2000 tons of steel here the latter part of June for export to Japan.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

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Scrap girder rails	7.00 to 7.25
No. 1 railroad wrought...	8.50 to 9.00
Machine shop turnings....	4.00 to 4.25
Cast iron borings (steel works and rolling mill)	4.00 to 4.50
Bundled skeleton, long....	6.00 to 7.00
Forge flashings	7.00 to 7.50
Blast furnace borings and turnings	4.00 to 4.10
Forge scrap	7.00 to 7.50
Shafting	12.50 to 13.00
Steel car axles	15.50 to 16.00
Wrought pipe, 1 in. in diameter (over 2 ft. long)	7.00 to 7.50
Rails for rolling.....	9.00 to 9.50
Cast iron borings, chemical	9.00 to 9.25

Prices per gross ton deliv'd consumers' yards:

Textile cast	$11.00 to $12.50
No. 1 machinery cast.....	14.00 to 14.50
No. 2 machinery cast.....	12.50 to 13.00
Stove plate	10.00 to 10.50
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Foundry iron prices per gross ton deliv'd to most New England points:

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†Buffalo, sil. 2.25 to 2.75..	20.78 to 21.78
*Buffalo, sil. 1.75 to 2.25..	20.91 to 21.91
*Buffalo, sil. 2.25 to 2.75..	21.41 to 22.41
Va., sil. 1.75 to 2.25.....	25.21
Va., sil. 2.25 to 2.75.....	25.71
*Ala., sil. 1.75 to 2.25.....	22.61
*Ala., sil. 2.25 to 2.75.....	23.11
†Ala., sil. 1.75 to 2.25.....	18.75
†Ala., sil. 2.25 to 2.75.....	19.25

Freight rates: $4.91 all rail and $4.28 rail and water from Buffalo; $5.21 all rail from Virginia; $9.61 all rail from Alabama and $5.75 rail and water from Alabama to New England seaboard.
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Coke.—Approximately 95 per cent of the New England foundries have contracted for their last half fuel requirements.

Old Material.—The firmer Pittsburgh market for No. 1 heavy melting steel is reflected to some extent in this district, but prices for most other

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars, small shapes.....	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars.....3.265c. to 3.54c.	
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway rounds	6.60c.
Norway squares and flats	7.10c.
Spring steel—	
Open-hearth .....5.00c. to 10.00c.	
Crucible .....12.00c.	
Tie steel .....4.50c. to 4.75c.	
Bands .....4.015c. to 5.00c.	
Hoop steel .....5.50c. to 6.00c.	
Cold-rolled steel—	
Rounds and hex.....*3.55c. to 5.55c.	
Squares and flats....*4.05c. to 7.05c.	
Toe calk steel	6.00c.
Rivets, structural or boiler.....	4.50c.

	Per Cent Off List
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot-pressed nuts	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

*Including quantity differentials.

BIRMINGHAM

Steel Bookings Show Gain for First Time in Weeks—Pig Iron Slow

BIRMINGHAM, June 10.—Pig iron releases this month have averaged a shade lighter than the May rate. Buying is slow, individual sales being uniformly small. Unless there is an early change in sentiment, third quarter books will be opened with prospects of a large part of the buying to be on a hand-to-mouth basis. Present sales are limited to June delivery at the unchanged price of $14. Furnace operations are the same, 17 stacks being active.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil.	$14.00
No. 1 fdy., 2.25 to 2.75 sil.	14.50
Basic	14.00

Finished Steel. — Bookings last week, for the first time in several weeks, showed a substantial increase over those in the preceding week. A better demand for sheets is interpreted as the beginning of the improved buying period that usually starts in July. Some pending rail orders were closed last week. This will defer the closing of the rail mill, an event which was generally reported here last week as being planned for this week. Plate demand shows some improvement, but bars are merely holding their own.

All prices are the same with the exception of galvanized sheets, which have been reduced $1 a ton to 3.35c.

Structural steel fabricators report the trade still reluctant to place work. The Ingalls Iron Works Co. has booked 800 tons for a shop building for the Norfolk & Western Railroad at Roanoke, Va. A 3000-ton project for the Southern Kraft Corporation at Panama City, Fla., has been placed with a St. Louis fabricator. The Tennessee Coal, Iron & Railroad Co. has asked bids on 1100 tons for a sheet mill at its Fairfield works. Upward of 2000 tons is pending for a hotel at Atlanta, on which bids have been opened.

Open-hearth operations remain at about 80 per cent of capacity.

Cast Iron Pipe.—Promised tonnages are slow in reaching order books, and pressure pipe makers are relying on small tonnage to fill in with the old orders on the books. Private buying is holding up better than municipal buying and compares favorably with that of a year ago. Advertised projects include 50,000 ft. of 8-in. pipe for Memphis, Tenn., to be awarded June 11; 11,470 ft. of 6-in. pipe for Gulfport, Miss., to be let June 12, and a small tonnage to be awarded by Franklin, Tenn., on June 15. Nashville, Tenn., is considering calling bids on 200 tons. The Central Foundry Co. has booked 100 tons for Shreveport, La. Operations and prices are unchanging, $37 to $38 a ton, Birmingham, being named for 6-in. and larger sizes.

Coke.—The Semet-Solvay Co. has reduced its active by-product coke ovens at Ensley by 30 and is now operating 120 of 240. Of the 1390 ovens in the district, 1201 are active. Foundry and domestic coke specifications are somewhat easier. Prices remain at $5 a net ton, Birmingham.

Old Material.—Dealers' supplies are plentiful for the present weak market, but they would be insufficient to supply a normal demand. Recent price reductions in steel grades have not stimulated demand.

Prices per gross ton deliv'd Birmingham dist. consumers' yards:

Heavy melting steel	$12.00
Scrap steel rails	12.50 to 13.00
Short shoveling turnings	9.00
Cast iron borings	9.00
Stove plate	11.50 to 12.00
Steel axles	20.00
Iron axles	23.00
No. 1 railroad wrought	10.00 to 10.50
Rails for rolling	14.50
No. 1 cast	13.00
Tramcar wheels	12.50
Cast iron carwheels	13.00 to 13.50
Cast iron borings, chem.	13.50 to 14.00

ST. LOUIS

Pig and Scrap Dull—Granite City Steel Co. Announces Third Quarter Sheet Prices

ST. LOUIS, June 10.—The market for pig iron seems to become quieter as the end of the second quarter approaches. The only sale of the St. Louis Gas & Coke Corporation was 1000 tons to an Iowa stove manufacturer. Only four or five inquiries, averaging from 300 to 500 tons, are pending. Melters are showing very little interest in their future requirements, but makers hold prices steady, declaring that there are no large stocks of pig iron and, with any kind of demand for finished products, there should be a sudden and fairly strong buying movement. So far, the movement of boat iron to Chicago has had no effect on prices here. Most melters in this district are said to be operating on a four-day week basis, the melt being about 65 per cent of normal.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.	$19.00
Malleable, f.o.b. Granite City	19.00
N'th'n No. 2 fdy., deliv'd St. Louis	20.66
Southern No. 2 fdy., deliv'd	17.42
Northern malleable, deliv'd	20.66
Northern basic, deliv'd	20.66

Freight rates: 75c. (average) Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

Finished Steel.—The Granite City Steel Co. has announced the following prices f.o.b. Gary, for third quarter: galvanized sheets, 3.30c.; one-pass cold rolled, 2.65c.; blue annealed sheets, No. 13 gage, 2.25c.; blue annealed light plates, No. 10 gage, 2.10c. These prices are lower than prevailed at the opening of the second quarter, but are in line with prices quoted at present. The bright spot in the trade is the demand for tin plate, which is fairly active. Other lines are quiet. Structural demand is light.

Old Material.—The market for old material is exceedingly dull. Consumers in the district are buying almost nothing and give no indications as to when they will reenter the market. Dealers are without orders and feel that present prices are still not sufficiently attractive to warrant their laying down scrap in their yards. Hence, most of the material offered by railroads is being sold in other markets. Country dealers are laying down scrap, and are said to be paying more for it than they can get from dealers in the cities. No. 1 locomotive tires and No. 1 railroad wrought are 50c. off.

Railroad lists include: Chesapeake & Ohio, 6730 tons; Southern Pacific, 4085 tons; Wabash, 1730 tons; Chicago, Burlington & Quincy, 200 tons; Ann Arbor, 191 tons; Great Northern, 56 carloads; St. Louis-San Francisco, 27 carloads; Chicago & Eastern Illinois, 22 carloads.

Dealers' buying prices per gross ton, f.o.b. St. Louis district:

Selected heavy melting steel	$11.50 to $12.00
No. 1 heavy melting or shoveling steel	10.75 to 11.25
No. 2 heavy melting or shoveling steel	10.00 to 10.50
No. 1 locomotive tires	13.00 to 13.50
Misc. stand.-sec. rails including frogs, switches and guards, cut apart	11.50 to 12.00
Railroad springs	13.75 to 14.25
Bundled sheets	7.50 to 8.00
No. 2 railroad wrought	10.75 to 11.25
No. 1 busheling	9.75 to 10.25
Cast iron borings and shoveling turnings	9.25 to 9.50
Iron rails	11.00 to 11.50
Rails for rolling	12.50 to 13.00
Machine shop turnings	6.00 to 6.50
Heavy turnings	8.50 to 9.00
Steel car axles	15.50 to 16.00
Iron car axles	25.50 to 26.00
Wrot. iron bars and trans.	16.00 to 16.50
No. 1 railroad wrought	8.50 to 9.00
Steel rails, less than 3 ft.	13.50 to 14.00
Steel angle bars	10.25 to 10.75
Cast iron carwheels	12.50 to 13.00
No. 1 machinery cast	12.75 to 13.25
Railroad malleable	12.25 to 12.75
No. 1 railroad cast	11.50 to 12.00
Stove plate	10.00 to 10.50
Relay. rails, 60 lb. and under	20.50 to 23.50
Relay. rails, 70 lb. and over	26.50 to 29.00
Agricult. malleable	12.00 to 12.50

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-fin. rounds, shafting, screw stock	3.60c.
Black sheets (No. 24)	4.25c.
Galv. sheets (No. 24)	4.85c.
Blue ann'l'd sheets (No. 10)	3.45c.
Black corrug. sheets (No. 24)	4.30c.
Galv. corrug. sheets	4.90c.
Structural rivets	4.15c.
Boiler rivets	4.15c.

	Per Cent Off List
Tank rivets, 7/8-in. and smaller, 100 lb. or more	65
Less than 100 lb	60
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, sq., blank or tapped, 200 lb. or more	60
Less than 200 lb	50
Hot-pressed nuts, hex., blank or tapped, 200 lb. or more	60
Less than 200 lb	50

BUFFALO

Pig Iron and Scrap Markets Continue Dull—Steel Operations Fairly Steady

BUFFALO, June 10.—No improvement is noted in the sales of pig iron in this territory. It is probable that no more than 2000 tons was sold in the past week by the producers in this territory. The General Electric Co. is inquiring for 750 tons of foundry iron for a New England plant, and this seems to be the outstanding inquiry for the week. Two inquiries in New York State for 150 tons of foundry each are noted. Sales have been principally in carload lots, with half a dozen 100 to 150-ton sales reported. The price in the district is $18.50 for foundry and $19 for malleable. On Eastern business, an effort is being made to obtain $16.50, base Buffalo, but this has been shaded in some instances to $16.

Prices per gross ton f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25	$18.50
No. 2X fdy., sil. 2.25 to 2.75	19.00
No. 1 fdy., sil. 2.75 to 3.25	20.00
Malleable, sil. up to 2.25	19.00
Basic	17.50
Lake Superior charcoal	27.28

Finished Steel.—Mill operation continues at the same pace as last week. The Lackawanna plant of the Bethlehem Steel Co. is still proportionately the heavy operator of the district, with 22 of 24 open-hearths active.

The fabricated structural steel situation is quiet, with very few sizable orders. A Buffalo fabricator obtained a contract for 150 to 200 tons of structural steel for the erection of a new Kresge store in Rochester. It is reported unofficially that contracts have been signed with D. E. Horton Construction Co. by the Ford Motor Co. for the erection of the foundation for the new Ford assembly plant in Buffalo.

Old Material.—New orders have been at a minimum in the past week. A sale of short mixed borings and turnings for blast furnace use at $9.50 is noted. A sale of cast iron carwheels is reported at $14 with dealers paying $13.75 to $14 for this material.

Prices per gross ton f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$13.00 to $14.00
No. 2 heavy melting scrap	11.25 to 11.75
Scrap rails	13.00 to 13.50
Hydraul. comp. sheets	11.50 to 12.00
Hand bundled sheets	10.00 to 10.50
Drop forge flashings	11.50 to 12.00
No. 1 busheling	11.75 to 12.75
Hvy. steel axle turnings	11.50 to 12.00
Machine shop turnings	8.00 to 8.50
No. 1 railroad wrought	10.50 to 11.00
Acid Open-Hearth Grades:	
Knuckles and couplers	16.00 to 16.50
Coil and leaf springs	16.00 to 16.50
Rolled steel wheels	16.00 to 16.50
Low phos. billet and bloom ends	17.00 to 17.50
Electric Furnace Grades:	
Short shov. steel turnings	10.75 to 11.00
Blast Furnace Grades:	
Short mixed borings and turnings	9.50 oo 10.00
Cast iron borings	9.50 to 10.00
No. 2 busheling	7.00
Rolling Mill Grades:	
Steel car axles	16.50 to 17.00
Iron axles	19.50 to 20.00
Cupola Grades:	
No. 1 machinery cast	12.00 to 12.50
Stove plate	10.75 to 11.00
Locomotive grate bars	9.00 to 9.50
Steel rails, 3 ft. and under	16.00 to 16.50
Cast iron carwheels	13.50 to 14.00
Malleable Grades:	
Industrial	15.50 to 16.00
Railroad	15.50 to 16.00
Agricultural	15.50 to 16.00
Special Grades:	
Chemical borings	11.50 to 12.00

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and struc. shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.95c.
Cold-fin. flats and sq.	3.65c.
Rounds and hex	3.15c.
Cold-rolled strip steel	5.85c.
Black sheets (No. 24)	4.20c.
Galv. sheets (No. 24)	4.85c.
Blue ann'l'd sheets (No. 10)	3.50c.
Com. wire nails, base per keg	$3.20
Black wire, base per 100 lb	3.50

Canada

Structural Steel Demand Beginning to Improve

TORONTO, June 10.—While the spot demand for merchant pig iron has shown little improvement of late, local blast furnace representatives state that some melters are beginning to show interest in their future requirements. Books have been opened for third quarter contracts and inquiries are appearing. While a few melters have placed contracts, the majority appear to be in no hurry to make known their requirements. Carryover from second quarter will be fairly heavy, and there are some indications of curtailed operations before the first of September. At the present time the melt is around 70 to 80 per cent. Prices are firm.

Prices per gross ton:

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75	$22.60
No. 2 fdy., sil. 1.75 to 2.25	22.10
Malleable	22.60
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75	$24.00
No. 2 fdy., sil. 1.75 to 2.25	23.50
Malleable	24.00
Basic	22.50
Imported Iron, Montreal Warehouse	
Summerlee	$33.50
Carron	33.00

Structural Steel.—The demand is beginning to show some improvement. Between 2000 and 3000 tons has been placed with Canadian Vickers, Ltd., for the new copper refinery at Montreal East; Mackinnon Steel Corporation, Ltd., Sherbrooke, Que., received an order for 500 tons for a fertilizer building at Beloeil, Que. Several large contracts are pending in connection with bridge and building construction projects.

Old Materials.—Sales for the week run to somewhat better tonnage than those of the previous three or four weeks. Small tonnages of heavy melting steel and turnings were taken by Hamilton mills during the week, and Toronto and Montreal buyers were also more prominent in the market for steel grades. The greater part of the new business, however, still runs to the iron grades. Prices are unchanged.

Dealers' buying prices:

	Per Gross Ton	
	Toronto	Montreal
Heavy melting steel	$9.00	$8.00
Rails, scrap	11.00	9.00
No. 1 wrought	9.00	11.00
Machine shop turnings	7.00	6.00
Boiler plate	7.00	6.50
Heavy axle turnings	7.50	6.50
Cast borings	6.50	5.00
Steel borings	6.50	6.00
Wrought pipe	6.00	6.00
Steel axles	14.00	17.00
Axles, wrought iron	16.00	19.00
No. 1 machinery cast	....	16.00
Stove plate	....	12.00
Standard carwheels	....	14.50
Malleable	....	13.00
Per Net Ton		
No. 1 mach'ry cast	15.00	....
Stove plate	11.00	....
Standard carwheels	14.00	....
Malleable scrap	11.00	....

Scrap Declines Again at Detroit

DETROIT, June 10.—Several grades of scrap have declined further in the past week. Long turnings, hydraulic compressed sheets, new No. 1 busheling and sheet clippings are 25c. a ton below their prices of a week ago. No large sales are reported.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Hvy. melting and shov. steel	$11.25 to $11.75
Borings and short turnings	7.25 to 7.75
Long turnings	6.50 to 7.00
No. 1 machinery cast	11.25 to 11.75
Automotive cast	13.50 to 14.00
Hydraul. comp. sheets	10.50 to 11.00
Stove plate	9.00 to 9.50
New No. 1 busheling	9.75 to 10.25
Old No. 1 busheling	8.75 to 9.25
Sheet clippings	8.00 to 8.50
Flashings	9.75 to 10.25

Coal on Hand for 24 Days

Stocks of bituminous coal in the hands of industries in the United States are estimated by the National Association of Purchasing Agents to be equivalent to 24 days' use at current rates of consumption. By-product coke plants have coal for 17 days; electric utilities for 45 days; coal gas plants for 46 days; railroads for 18 days; steel mills for 27 days; other industries for 28 days.

Consumption during April by the various industries is estimated at 36,230,000 net tons. Except for February, a short month, this is the smallest total since last September. The quantity on hand May 1 is given as 30,700,000 tons. This was smaller than at any previous date for more than a year, having shown a shrinkage of more than 800,000 tons from the total on April 1. It compares with 33,468,000 tons one year earlier.

CINCINNATI

Sheet Demand Drops to 50 Per Cent of Capacity—Pig Iron Sales 2880 Tons

CINCINNATI, June 10.—While total sales of pig iron increased about 700 tons last week over the preceding week, bringing total business to 2880 tons, the market tone is dull and sluggish. Buyers are still taking material only as the need arises. The foundry melt generally is declining, with present production estimated at about 40 per cent of capacity. Northern iron still leads in the demand, with Southern slow and quiet.

Among the week's sales was 100 tons of silvery for shipment into central Ohio. A Dayton, Ohio, consumer entered the market for 750 tons of Northern foundry iron, and two others took 100 tons each. Another order for 100 tons was placed by an eastern Indiana buyer. A Piqua, Ohio, melter is inquiring for 400 tons of Southern iron.

Prices per gross ton, deliv'd Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25	$20.89 to $21.39
Ala. fdy., sil. 1.75 to 2.25	16.69 to 17.69
Ala. fdy., sil. 2.25 to 2.75	17.19 to 18.19
Tenn. fdy., sil. 1.75 to 2.25	17.19 to 17.69
S'th'n Ohio silvery, 8 per cent	26.89

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

Coke.—With the melt declining, specifications for by-product foundry coke are slowing up. New business is infrequent and in small quantities.

Finished Material.—Demand for sheets declined last week. District sheet mills report that fresh bookings averaged about 50 per cent of capacity. Accordingly, production has been curtailed to about 40 to 50 per cent of capacity.

Old Material.—Scrap iron dealers are marking time. No reduction in dealers' prices was made last week, but the present demand does not warrant any revision upward. The Louisville & Nashville Railroad is offering a list of 12,000 tons, and the Southern is expected to publish its usual list the latter part of this week.

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and struc. shapes	3.40c.
Bars, soft steel or iron	3.30c.
New billet reinforc. bars	3.30c.
Rail steel reinforc. bars	3.15c.
Hoops	4.05c.
Bands	3.50c.
Cold-fin rounds and hex	3.80c.
Squares	4.30c.
Black sheets (No. 24)	4.05c.
Galvanized sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.45c.
Structural rivets	4.20c.
Small rivets	60 per cent off list
No. 9 ann'l'd wire, per 100 lb	$3.00
Com. wire nails, base per keg (25 kegs or more)	2.95
Cement c't'd nails, base 100 lb. keg	2.95
Chain, per 100 lb	10.25
	Net per 100 Ft.
Lap-welded steel boiler tubes, 2-in.	$16.50
4-in.	34.50
Seamless steel boiler tubes, 2-in.	17.50
4-in.	36.00

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel	$11.00 to $11.50
Scrap rails for melting	11.75 to 12.25
Loose sheet clippings	8.00 to 8.50
Bundled sheets	10.00 to 10.50
Cast iron borings	8.00 to 8.50
Machine shop turnings	7.50 to 8.00
No. 1 busheling	9.50 to 10.00
No. 2 busheling	6.00 to 6.50
Rails for rolling	13.00 to 13.50
No. 1 locomotive tires	13.50 to 14.00
No. 2 railroad wrought	11.00 to 11.50
Short rails	17.00 to 17.50
Cast iron carwheels	12.00 to 12.50
No. 1 machinery cast	17.50 to 18.00
No. 1 railroad cast	14.50 to 15.00
Burnt cast	8.25 to 8.75
Stove plate	8.25 to 8.75
Brake shoes	8.25 to 8.75
Agricultural malleable	14.00 to 14.50
Railroad malleable	15.00 to 15.50

National Steel Officers Visit Superior Mines

Officers and directors of the National Steel Corporation, Pittsburgh, are inspecting the ore properties of its subsidiaries this week. The inspection trip started Monday at the Richmond mine on the Marquette range and continues through Saturday. Properties on the Menominee, Gogebic, Cuyuna and Mesaba ranges will be visited, the tour winding up at Hibbing, Minn., June 14.

In the group visiting the mines are E. T. Weir, chairman; George R. Fink, president; F. M. Hesse, treasurer, and George M. Humphrey, chairman of the executive committee. Directors of the corporation making the trip are Howard M. Hanna, chairman, M. A. Hanna Co., Cleveland; C. A. Collins, president, Hanna Furnace Co., division of National Steel; J. C. Williams, president, Weirton Steel Co., division of National Steel; E. W. Mudge of E. W. Mudge & Co., Pittsburgh; Carlton M. Higbie of Keane, Higbie & Co., Detroit, and C. M. Thorp of Thorp, Bostwick, Stewart & Reed, Pittsburgh.

Other members of the party include L. C. Hanna, Jr., member of the executive committee of M. A. Hanna Co.; H. L. Pierce, secretary, and C. N. Hickok, vice-president, of the Hanna mining companies; F. S. Bale, vice-president of Bankers Trust Co., New York, and Albert Heekin, president of the Heekin Can Co., Cincinnati.

Steel Corporation's Orders Show Sharp Loss

Unfilled orders of the United States Steel Corporation on May 31 were 4,059,227 tons, showing a decline of 294,993 tons, or 6.8 per cent, from the total on April 30 and making the lowest backlog since that of Sept. 30, 1929. The cumulative gain from Aug. 31 to March 31 was 912,442 tons. Since then a drop of 511,426 tons has been incurred.

Unfilled tonnage at the end of each month for the past two years follows:

	1930	1929	1928
May	4,059,227	4,304,167	3,416,822
April	4,354,220	4,427,763	3,872,133
March	4,570,653	4,410,718	4,335,206
February	4,479,748	4,144,341	4,398,189
January	4,468,710	4,109,487	4,275,947
December	.....	4,417,193	3,976,712
November	.....	4,125,345	3,673,000
October	.....	4,086,562	3,751,030
September	.....	3,902,581	3,698,368
August	.....	3,658,211	3,624,043
July	.....	4,088,177	3,570,927
June	.....	4,256,910	3,637,000

The total on March 31 was the largest since Feb. 28, 1926. Except for one year ago the total of May 31 was the largest for that date since 1923.

Apparatus Permits Six Languages at Conference

BERLIN, GERMANY, May 24.—An innovation in reception of speeches at international gatherings is to be tried at the Second Plenary World Power Conference here June 16 to 25. Interpreters will translate the speeches simultaneously, speaking into microphones connected directly with the desk of each delegate, who may listen to his own language through headphones. A switchbox at the desk permits the listener to switch to the language with which he is most familiar. With the full number of interpreters employed, six languages will be available.

Steel and Malleable Castings Made and Sold

		April, 1930	March, 1930	April, 1929
Commercial steel castings (a), net tons:				
Production,	total	110,999	113,739	121,941
do.	railroad items	45,778	47,815	53,468
do.	miscellaneous	65,221	65,924	68,483
do.	four months	441,929	.....	428,085
New orders,	total	93,208	122,658	144,616
do.	railroad items	35,530	54,063	75,625
do.	miscellaneous	57,678	68,595	68,991
do.	four months	432,321	.....	515,404
Malleable iron castings (a), net tons:				
Production		59,837	62,733	83,744
do.	four months	249,993	.....	314,109
Shipments		58,854	64,108	80,968
do.	four months	240,753	.....	310,355
Orders		52,369	59,690	80,777
do.	four months	231,664	.....	322,284

(a) United States Department of Commerce.

Non-Ferrous Metal Markets

Copper Inactive but Firm—Tin Stagnant—Lead Steady—Zinc Lower

NEW YORK, June 10.

Copper. — Domestic demand has come almost to a standstill, and foreign buying has fallen off decidedly. Buying here is confined to carload and small lots, and purchases from abroad do not average much over 500 to 600 tons a day. The total thus far this month for shipment abroad has been about 10,000 tons. The present situation naturally follows the very heavy buying last month, and an active market is not looked for for some weeks. Consumers here and abroad are well covered for June and most of July, it is believed.

Prices remain exceedingly firm and there are no indications of any change, up or down. Electrolytic copper is quoted at 13c., delivered in the Connecticut Valley, for June, July and August and the price of Copper Exporters, Inc., stands at 13.30c. c.i.f. usual European ports. Lake copper is very dull at 13c. to 13.12½c., delivered.

Statistics for May, which will be made public in a day or two, are expected to show a small increase in stocks of refined metal, but probably a decrease in stocks of metal above ground, with a reduction in daily output at the mines.

Tin.—This market could hardly be more stagnant. With a holiday in London yesterday and with practically no interest on the part of consumers here, transactions are almost negligible. Buyers have no confidence at all in the situation and, being apparently well covered for some time, are taking no interest. Prices have advanced slightly both here and abroad, due largely to a slight reaction from the low levels last week.

Spot Straits tin today was quoted at 30.37½c., New York, and quotations in London were as follows: Spot standard, £137 12s. 6d., future standard, £139 12s. 6d., and spot Straits, £139 12s. 6d. The Singapore price today was £144.

Stocks in London warehouses on Saturday, June 7, were 19,924 tons, the largest total in many weeks. This is an increase of 640 tons over the total two weeks ago of 19,284 tons on May 24.

Lead.—Very little contracting for large tonnages is noted, but there is moderate activity in carload and small lots, mostly for June delivery. Prices hold firm and unchanged at 5.40c., St. Louis. The contract price of the leading interest is unchanged at 5.50c., New York.

THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY

	June 10	June 9	June 7	June 6	June 5	June 4
Lake copper, New York	13.12½	13.12½	13.12½	13.12½	13.12½	13.12½
Electrolytic copper, N. Y.*	12.75	12.75	12.75	12.75	12.75	12.75
Straits tin, spot, N. Y.	30.37½	30.87½	....	30.87½	30.50	30.25
Zinc, East St. Louis	4.60	4.60	4.60	4.60	4.60	4.60
Zinc, New York	4.95	4.95	4.95	4.95	4.95	4.95
Lead, St. Louis	5.40	5.40	5.40	5.40	5.40	5.40
Lead, New York	5.50	5.50	5.50	5.50	5.50	5.50

*Refinery quotation; price ¼c. higher delivered in the Connecticut Valley.

Zinc.—Announcement this week of an increase in stocks of refined metal of about 5000 tons during May caused some weakness, and prices eased off to 4.60c., East St. Louis, or 4.95c., New York. Demand for prime Western is only moderate and confined mostly to carload and small lots.

Ore is unchanged at $31, Joplin, with the production for the week about 9500 tons, practically the same as a week ago. Shipments last week were about 10,100 tons and sales about 9070 tons, leaving the estimated surplus at 27,933 tons.

Antimony.—There has been some consumer buying at the prevailing quotation of 7.10c., New York, duty paid, for Chinese metal, but generally the market is inactive. Futures are quoted at 7c., duty paid.

Nickel.—Ingot nickel in wholesale lots is quoted at 35c. a lb., with shot nickel at 36c. and electrolytic nickel in cathodes at 35c.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is obtainable at the published price of 23.90c. a lb., delivered.

Non-Ferrous Metals at Chicago

CHICAGO, June 10.—Demand for non-ferrous meals is a trifle broader. Prices for tin have advanced while quotations on antimony are lower. The old metal market is quiet and prices are unchanged.

Prices per lb., in carload lots: Lake copper, 13.25c.; tin, 31.65c.; lead, 5.50c.; zinc, 4.75c.; in less-than-carload lots, antimony, 8.25c. On old metals we quote copper wire, crucible shapes and copper clips, 9.50c; copper bottoms, 8c.; red brass, 8c.; yellow brass, 6c.; lead pipe, 4.25c.; zinc, 2c.; pewter, No. 1, 17.50c.; tin-foil, 20c.; block tin, 26.50c.; aluminum, 8.50c.; all being dealers' prices for less-than-carload lots.

New York, Chicago or Cleveland Warehouse

Delivered Prices, Base per Lb.

High brass	19.75c.
Copper, hot rolled, base sizes	22.75c.
Copper, cold rolled, 14 oz. and heavier, base sizes	25.00c.
Seamless Tubes—	
Brass	24.75c.
Copper	25.00c.
Brass Rods	18.00c.
Brazed Brass Tubes	27.25c.

New York Warehouse

Delivered Prices, Base per Lb.

Zinc sheets (No. 9), casks	10.25c. to 10.75c.
Zinc sheets, open	11.25c. to 11.75c.

Metals from New York Warehouse

Delivered Prices, Per Lb.

Tin, Straits pig	33.50c. to 34.50c.
Tin, bar	35.50c. to 36.50c.
Copper, Lake	14.75c.
Copper, electrolytic	14.50c.
Copper, casting	14.25c.
Zinc, slab	6.25c. to 7.25c.
Lead, American pig	6.50c. to 7.00c.
Lead, bar	8.00c. to 8.50c.
Antimony, Asiatic	10.00c. to 10.50c.
Aluminum No. 1 ingots for remelting (guaranteed over 99% pure)	25.00c. to 26.00c.
Alum. ingots, No. 12 alloys	24.00c. to 25.00c.
Babbitt metal, commercial grade	25.00c. to 35.00c.
Solder, ½ and ½	23.25c. to 24.25c.

Metals from Cleveland Warehouse

Delivered Prices, Per Lb.

Tin, Straits pig	36.25c.
Tin, bar	38.25c.
Copper, Lake	14.00c.
Copper, electrolytic	14.00c.
Copper, casting	13.62c.
Zinc, slab	7.00c. to 7.25c.
Lead, American pig	6.25c. to 6.50c.
Lead, bar	8.75c.
Antimony, Asiatic	14.00c.
Babbitt metal, medium grade	17.50c.
Babbitt metal, high grade	41.00c.
Solder, ½ and ½	23.75c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged consumers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	10.25c.	11.75c.
Copper, hvy. and wire	10.00c.	11.25c.
Copper, light and bottoms	8.75c.	10.25c.
Brass, heavy	5.75c.	7.25c.
Brass, light	4.75c.	6.00c.
Hvy. machine composition	8.50c.	9.50c.
No. 1 yel. brass turnings	5.75c.	6.75c.
No. 1 red brass or compos. turnings	7.75c.	8.75c.
Lead, heavy	4.00c.	4.62½c.
Lead, tea	3.00c.	3.50c.
Zinc	2.50c.	3.00c.
Sheet aluminum	7.50c.	9.50c.
Cast aluminum	7.00c.	9.00c.

Reinforcing Steel

Awards Light at 3500 Tons—New Inquiries 8900 Tons

LETTINGS of reinforcing steel the past week were light, totaling only 3500 tons. The largest was 1300 tons for a sewage treating plant at Galesburg, Ill. New projects, at 8900 tons, compare with 5200 tons a week ago and include 5100 tons for sewer construction work. Awards follow:

STATE OF NEW JERSEY, 400 tons, Pennsylvania Railroad bridge over Hackensack River, to Concrete Steel Co.

LOUISVILLE, KY., 440 tons, Bell Telephone Co. building, to E. J. Whalen Steel Construction Co.

CLEVELAND, 475 tons, warehouse for General Electric Development Co., to Patterson Leitch Co.

CHICAGO, 350 tons, Morrison Hotel, to Olney J. Dean & Co.

GALESBURG, ILL., 1300 tons, sewage treating plant, to Inland Steel Co.

CLAREMONT, CAL., 250 tons, improvement of Mesa Street, to unnamed bidder.

LOS ANGELES, 200 tons, office building addition at 6253 Hollywood Boulevard, to unnamed company.

OLYMPIA, WASH., 100 tons, bridge in Callam County, to an unnamed bidder.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

BERGEN COUNTY, N. J., 255 tons, State highway route 6, sections 1C and 2; Anthony Cianciulli, Yonkers, N. Y., low bidder on general contract.

SAFE HARBOR, PA., 2000 tons, power house dam.

KENTUCKY & INDIANA RAILROAD, 400 tons, underpass at Louisville.

LOUISVILLE, 5100 tons, sewer construction work.

LOUISVILLE, 450 tons, school.

CHICAGO, tonnage being estimated, Chicago Yacht Club.

RENO, NEV., 103 tons, sewer; bids June 23.

PASADENA, CAL., 300 tons, hotel addition, 125 South Grand Street; bids being taken.

SACRAMENTO, 315 tons, highway work in San Diego County; bids June 25.

Railroad Equipment

Erie Orders 150 Ballast Cars—Will Buy 50 More

IN a dull market, the outstanding order is for 150 ballast cars, placed by the Erie with the American Car & Foundry Co. Details follow:

Erie has ordered 150 ballast cars from American Car & Foundry Co. Fifty more are to be placed. This road is inquiring for eight passenger coaches.

Union Pacific is inquiring for 14 passenger chair cars, 10 baggage cars and one baggage-postal car.

Missouri-Kansas-Texas has ordered 3 dining cars from American Car & Foundry Co.

Northwestern Refrigerator Co. will build in its own shops 50 refrigerator cars, for which American Car & Foundry Co. will supply the underframes.

Mexican Railway is inquiring for 85 box cars, 15 automobile cars, 4 caboose cars and 4 steel coaches.

Lehigh Navigation Coal Co. has ordered 7 air-dump cars from Magor Car Corporation.

United Fruit Co. has ordered 25 banana cars from Magor Car Corporation.

Chicago, Burlington & Quincy has ordered 5 gas-electric rail motor coaches from Pullman Car & Mfg. Corporation.

South African Iron & Steel Corporation, Ltd., Pretoria, South Africa, has ordered one 4-8-2 type locomotive from Baldwin Locomotive Works.

Blaw-Knox Co. Receives Steel Plant Orders

The Blaw-Knox Co., Pittsburgh, has received orders from the Illinois Steel Co. for reversing valves, stack and waste-heat boiler dampers for installation in 14 new open-hearth furnaces at the South Works and seven at the Gary Works. The company has also received orders for similar equipment from the Bethlehem Steel Corporation for six new open-hearth furnaces at the Lackawanna plant at Buffalo and for six at the plant at Sparrows Point, Md.

Blaw-Knox reversing valves are also being installed on six large open-hearth furnaces at the new Detroit plant of the Great Lakes Steel Corporation, subsidiary of the National Steel Corporation, and the three new tilting furnaces at the plant of the National Tube Co. at McKeesport, Pa.

H. K. Ferguson Co. Acquires Engineering Firm

The H. K. Ferguson Co., Cleveland, has acquired the business assets and good will of Warren D. Spengler, Inc., consulting power plant engineer, 1015 Union Trust Building, Cleveland. Members of the organization include Warren D. Spengler, who established the business 11 years ago and two brothers, Ralph A. and Harold H. Spengler. The Spengler company has been employed by a number of the larger utilities and industrial companies to study and develop means of attaining more economical operation of their properties with special reference to production and use of steam power. The entire personnel of the Spengler organization will become a part of the Ferguson organization.

Ohio Foundrymen to Meet at Canton, June 18

The Ohio Foundries Association will hold a sectional meeting at the Brookside Country Club, Canton, June 18. Following luncheon, the afternoon will be devoted to talks on foundry subjects. The principal speaker will be D. A. Williston, Laclede-Christy Clay Products Co., St. Louis, who will talk on refractories that pertain to the foundry industry. J. W. Beall, Ohio Steel Foundry Co., Lima, Ohio, will discuss the Ohio foundry code. Robert Hopkins, Alliance, Brass & Bronze Co., Alliance, will be general chairman. A departure at these meetings will be the division of those in attendance into groups, with a chairman for each group. A. C. Denison, Fulton Foundry & Machine Co., will be chairman of the gray iron group; Theodore Harday, Ohio Steel Foundry Co., of the steel group and L. T. Henry, Maumee Malleable Casting Co., Toledo, of the malleable group.

Steel Corporation Buys Morris & Bailey Plant

The United States Steel Corporation has purchased the Morris & Bailey Division of the Oliver Iron & Steel Corporation at Wilson Station, Pa. Lying between the Clairton by-product coke works and other plants of the Carnegie Steel Co., the property was bought primarily to insure a permanent right-of-way for gas lines and a transmission line which pass through it. The Morris & Bailey plant has a capacity of 36,000 tons of cold-rolled strip annually and will be operated as a division of the American Steel & Wire Co.

Chicago Company to Build Russian Steel Plant

The Freyn Engineering Co., Chicago, has contracted to build a steel plant with an annual output of 1,000,000 tons at Kuznetsky, Russia. This plant will consist of four blast furnaces, 12 open-hearth furnaces, blooming, rail and structural, continuous billet and plate mills. There will also be constructed four batteries of coke ovens and a 96,000-kw. power plant.

Much of the material used in the construction of the Kuznetsky works will be fabricated and manufactured in Soviet industrial plants, but special machinery will be purchased in the United States and other countries.

Reading Iron Co. Increases Range of Pipe Sizes

The Reading Iron Co., Reading, Pa., which heretofore has manufactured puddled wrought iron pipe in sizes from ⅛ to 20 in. in diameter, has increased its range to include 22-in. and 24-in. The company says that the addition of these sizes opens a wide field for its pipe products in the natural gas industry and in large high-pressure power plants.

American Arch Co., manufacturer of air-cooled walls and suspended arches for boiler furnaces and industrial furnaces, has moved its main offices to the Lincoln Building, 60 East Forty-second Street, New York.

Pulverized Fuel Equipment Co., Chicago, has appointed the following as direct sales representatives: E. L. Sullivan, Oliver Building, Pittsburgh, and H. P. Rogers & Co., Leader Building, Cleveland.

Fabricated Structural Steel

New Projects of 112,000 Tons, Largest In 17 Months—Metropolitan Building Requires 25,000 Tons

NEW structural steel projects in the past week reached a total of more than 112,000 tons, the largest this year and more than 20,000 tons in excess of the best week of 1929, Oct. 10, when the total was 92,000 tons. Contributing to this total was 25,000 tons in a building for the Metropolitan Life Insurance Co., New York; 10,000 tons for an office building at 94 Broad Street, New York; 7000 tons for an apartment building in New York, and 15,000 tons for the West Philadelphia terminal of the Pennsylvania Railroad.

Awards of about 34,000 tons were larger than in the two previous weeks, but have been exceeded a number of times this year. Included were 2800 tons for a psychopathic hospital in New York and 2435 tons for New York Central grade crossing elimination in Syracuse, N. Y.

May was the largest month this year for awards of fabricated steel in the New York district, according to the Structural Steel Board of Trade, about 55,000 tons having been placed. This compares with only about 28,000 tons awarded in the New York district in April, the smallest month, and 38,000 tons in March. Awards follow:

North Atlantic States

PROVIDENCE, R. I., 380 tons, store, to Lehigh Structural Steel Co.

AMHERST, MASS., 300 tons, indoor baseball field to Palmer Steel Co.

ST. JOHNSBURY, VT., 100 tons, auditorium, to an unnamed fabricator.

BURLINGTON, VT., 172 tons, theater, to an unnamed fabricator.

NEW YORK, 1400 tons, apartment building at Eighth Avenue and Twenty-third Street, to Easton Structural Steel Co.

NEW YORK, 200 tons, building at Broadway and 104th Street, to George A. Just Co.

NEW YORK, 450 tons, garage at 234 East Eighty-fifth Street, to Kues Brothers.

NEW YORK, 2800 tons, Psychopathic Hospital on First Avenue, to American Bridge Co.

NEW YORK, 500 tons, Murray Hill-Guggenheim Dental Clinic on East Seventy-second Street, to Hedden Iron Construction Co.

NEW YORK, 1000 tons, Loew theater building in Astoria, reported to American Bridge Co.

NEW YORK CENTRAL RAILROAD, 700 tons, viaduct at West Sixty-fifth Street, to McClintic-Marshall Co.

FLORAL PARK, N. Y., 350 tons, school of Our Lady of Victory, to Levering & Garrigues Co.

ROCHESTER, N. Y., 150 tons, store for Kresge Co., to R. H. McMannus Steel Corporation.

ALBANY, N. Y., 375 tons, building for J. A. LaPorte Corporation, to Eastern Bridge & Structural Co.

SYRACUSE, N. Y., 2435 tons, New York Central grade crossing elimination, to McClintic-Marshall Co.

ELIZABETHPORT, N. J., 200 tons, factory building, to Harris Structural Steel Co.

BOUND BROOK, N. J., 160 tons, Calco Chemical Co. building, to Levering & Garrigues Co.

BAYWAY, N. J., 250 tons, Standard Oil Co., to Joseph T. Ryerson & Son, Inc.

PENNSYLVANIA RAILROAD, 100 tons, bridge at Radnor, Pa., to Belmont Iron Works.

VENANGO COUNTY, PA., 330 tons, bridge to Fort Pitt Bridge Works.

FORD CITY, PA., 1800 tons, Pittsburgh Plate Glass Co. building, to Jones & Laughlin Steel Corporation.

PITTSBURGH, 115 tons, American Tar Products Co. building, to McClintic-Marshall Co.

PITTSBURGH, 195 tons, Federal Cold Storage Co. building, to McClintic-Marshall Co.

The South

ROANOKE, VA., 800 tons, shop building for Norfolk & Western railroad, to Ingalls Iron Works.

LOUISVILLE, KY., 200 tons, two railroad bridges for Louisville & Nashville Railroad, to Virginia Bridge & Iron Co.

TRINIDAD, TEX., 1000 tons, building for Phoenix Utility Co., to Mosher Steel & Machinery Co., Trinidad.

PANAMA CITY, FLA., 2000 tons, building for International Paper Co., to Stupp Brothers Bridge & Iron Co., St. Louis.

Central States

DETROIT, 500 tons of plates, pipe line for city, to McClintic-Marshall Co.

DETROIT, 200 tons, Lonsdale Avenue bridge for Michigan Central Railroad, to American Bridge Co.

DETROIT, 1240 tons, addition to Connors Creek station of Detroit-Edison Co., to Bethlehem Steel Co.

DETROIT, 1860 tons, waterworks pumping plant and filter building, to McClintic-Marshall Co.

DETROIT, 160 tons, Michigan Central grade crossing separation at Springwell Avenue, to McClintic-Marshall Co.

CLEVELAND, 675 tons, warehouse for Fisher Body Corporation, to Jones & Laughlin Steel Corporation, previously reported awarded to another fabricator.

TOLEDO, 1315 tons, New York Central viaduct, to McClintic-Marshall Co.

YOUNGSTOWN, 1500 tons, extensions for Youngstown Sheet & Tube Co., to Fort Pitt Bridge Works.

CINCINNATI, 1500 tons, six barges for Barrett Line, Inc., to American Bridge Co.

INDIANAPOLIS, 336 tons, American Central Life Insurance Building, to Central States Bridge Co.

SOUTH BEND, IND., 1000 tons, factory for Bendix Aviation Corporation, to R. C. Mahon Co.; previously reported to an unnamed bidder.

CHICAGO, 400 tons, administration building for World's Fair, to Gage Structural Steel Co.; previously reported to an unnamed bidder.

SOUTH CHICAGO, 150 tons, building for Interlake Iron Corporation, to Worden-Allen Co.

MINNEAPOLIS, 4000 tons, building for Northwestern Bell Telephone Co., to Minneapolis-Moline Power Implement Co.

Western States

CLARENDON, ARK., 4600 tons, White River bridge, to Virginia Bridge & Iron Co. and American Bridge Co.

LONG BEACH, CAL., 450 tons, telephone building, Sixth and Elm Streets, to Consolidated Steel Corporation.

LOS ANGELES, 1100 tons, office building on South Hill Street, to McClintic-Marshall Co.

STRUCTURAL PROJECTS PENDING

Inquiries for fabricated steel work include the following:

North Atlantic States

PROVIDENCE, R. I., 100 tons, theater.

WATERBURY, CONN., 500 tons, building for S. S. Kresge Co.

LOWELL, MASS., 450 tons, Post Office.

WORCESTER, MASS., 450 tons, Post Office.

HARTFORD, CONN., 1200 tons, telephone exchange for New England Bell Telephone Co.

BOSTON, 1000 tons, Western Union Telegraph Co. building.

NEW YORK, 4000 tons, office building at 29 Broadway.

NEW YORK, 25,000 tons, Metropolitan Life Insurance Co. building.

NEW YORK, 10,000 tons, building at 94 Broad Street.

NEW YORK, 7000 tons, Tudor City building.

NEW YORK, 5000 tons, New York Telephone Co. building.

NEW YORK, 2500 tons, United States Government Assay Office.

BROOKLYN, 5000 tons, technical high school for boys.

STATE OF NEW YORK, 500 tons, highway bridges.

WILKINSBURG, PA., 400 tons, theater for Warner Brothers.

PENNSYLVANIA RAILROAD, 975 tons, consisting of Washington Avenue elevated, Philadelphia, 365 tons; transfer bridge in South Philadelphia, 210 tons, and bridges in Ohio, 400 tons.

PENNSYLVANIA RAILROAD, 4000 tons, pier on Hudson River; general contractor, J. Rich Steers, Inc., New York.

WEST PHILADELPHIA, PA., 15,000 tons, Pennsylvania Railroad terminal.

PHILADELPHIA, 6000 tons, apartment and garage building.

Central States

SUMMERFIELD, ILL., 245 tons, highway bridge.

CACHE, ILL., 210 tons, highway bridge.

CHICAGO, 6000 tons, repairs to 30 schools, program to extend over several months.

CHICAGO, 6000 tons, bridge for outer drive.

CHICAGO, 2500 tons, transportation building for World's Fair.

CHICAGO, 4000 tons, National Bank of Republic building.

SPRINGFIELD, ILL., 175 tons, waterworks power plant; Alvina-Urbana Construction Co., general contractors.

ST. LOUIS, 500 tons, paint shop for American Car & Foundry Co.

Western States

PROVO, UTAH, 750 tons, building for Pacific States Cast Iron Pipe Co.

RICHMOND, CAL., 4000 tons, Ford assembly plant; previously reported as 2000 tons.

SAN FRANCISCO, 1200 tons, Mills Building.

Largest Production of Rolled Steel Ever Reached

TOTAL PRODUCTION OF ALL KINDS OF FINISHED ROLLED IRON AND STEEL, GROSS TONS

Years.	Iron and steel rails.	Plates and sheets.	Wire rods.	Structural shapes.	Nail plate.	All other finished rolled.	Total Gross tons.
1913	3,502,780	5,751,037	2,464,807	3,004,972	37,503	10,030,144	24,791,243
1914	1,945,095	4,719,246	2,431,714	2,031,124	38,573	7,204,444	18,370,196
1915	2,204,203	6,077,694	3,095,907	2,437,003	31,929	10,546,188	24,392,924
1916	2,854,518	7,453,980	3,518,746	3,029,964	30,088	15,493,093	32,380,389
1917	2,944,161	8,267,616	3,137,138	3,110,000	22,864	15,585,921	33,067,700
1918	2,540,892	8,799,135	2,562,390	2,849,969	18,310	14,385,058	31,155,754
1919	2,203,843	7,372,814	2,538,476	2,614,036	12,832	10,359,543	25,101,544
1920	2,604,116	9,337,680	3,136,907	3,306,748	20,577	13,941,835	32,347,863
1921	2,178,818	4,260,574	1,564,330	1,272,624	14,573	5,483,087	14,774,006
1922	2,171,776	7,968,397	2,654,741	2,718,768	21,969	10,916,353	26,452,004
1923	2,904,516	9,497,717	3,075,892	3,405,197	22,833	14,370,921	33,277,076
1924	2,433,332	8,087,883	2,522,545	3,283,708	22,175	11,736,792	28,086,435
1925	2,785,237	9,807,659	2,844,656	3,604,130	22,038	14,323,220	33,386,960
1926	3,217,649	10,529,056	2,722,032	3,911,663	17,337	15,098,155	35,495,892
1927	2,806,486	9,627,734	2,770,271	3,742,445	18,051	13,914,044	32,879,031
1928	2,647,493	11,006,050	3,080,816	4,096,143	16,200	16,816,214	37,662,916
1929	2,722,138	12,436,312	3,134,409	4,778,020	9,827	17,988,710	41,069,416

PRODUCTION OF MERCHANT BARS, SHOWING IRON AND STEEL MERCHANT BARS SEPARATELY, GROSS TONS, 1910–1929.

Years.	Iron.	Steel.	Total.	Years.	Iron.	Steel.	Total.
1910	1,074,163	2,711,568	3,785,731	1920	663,032	5,467,208	6,130,240
1911	835,625	2,211,737	3,047,362	1921	198,324	1,367,430	1,565,754
1912	944,790	2,752,324	3,697,114	1922	317,665	3,660,993	3,978,658
1913	1,026,632	2,930,977	3,957,609	1923	404,730	5,148,066	5,552,796
1914	563,171	1,960,460	2,523,631	1924	258,737	4,022,184	4,280,921
1915	657,107	3,474,135	4,131,242	1925	290,488	5,368,827	5,659,315
1916	993,948	5,236,354	6,230,302	1926	252,437	5,221,399	5,473,836
1917	983,926	5,226,031	6,209,957	1927	187,995	4,682,252	4,870,247
1918	846,898	5,395,851	6,242,749	1928	165,277	6,112,558	6,277,835
1919	446,549	3,945,075	4,391,624	1929	154,690	6,316,456	6,471,146

PRODUCTION OF WROUGHT PIPE AND SEAMLESS STEEL TUBES, INCLUDING BOILER TUBES, GROSS TONS, IN 1929.

Kinds of pipe or tubes.	Lap weld and butt weld pipe or tubes—Gross tons.			Seamless pipe or tubes—Gross tons.		
	Iron	Steel.	Total welded.	*Hot finished.	Cold drawn.	Total seamless.
Black, standard	57,224	1,166,415	1,223,639	26,965	2,345	29,310
Galvanized	42,199	443,191	485,390	2,051	.....	2,051
Oil country goods	17,298	1,075,979	1,093,277	872,047	2,133	874,180
Mechanical tubes	.....	.....	.....	45,038	105,535	150,573
O. D. & miscellaneous	.....	154,758	154,758	5,507	65,184	70,691
Boiler tubes	10,052	51,624	61,676	145,851	30,829	176,680
Total	126,773	2,891,967	3,018,740	1,097,459	206,026	1,303,485

* Does not include hot finished tubes subsequently cold drawn.

PRODUCTION OF WROUGHT PIPE AND BOILER TUBES, 1924–1929.

Years.	Black, standard.	Galvanized.	Oil country goods.	O. D and miscellaneous.	Boiler tubes	Total. Gross tons.
1924	1,080,432	454,019	1,183,867	50,046	55,892	2,824,256
1925	1,232,375	548,567	1,018,302	168,519	62,778	3,030,541
1926	1,377,747	526,101	1,328,294	109,520	60,853	3,402,515
1927	1,237,783	488,232	1,199,936	144,515	46,985	3,117,451
1928	1,189,842	483,856	1,108,446	82,279	59,457	2,923,910
1929	1,223,639	485,390	1,093,277	154,758	61,676	3 018,740

PRODUCTION OF SEAMLESS STEEL TUBES, GROSS TONS, 1924–1929.

Years.	Hot finished.	Cold drawn.	*Total.	Years.	Hot finished.	Cold drawn.	*Total.
1924	131,758	129,399	261,157	1927	725,970	138,170	* 864,140
1925	403,965	164,225	568,190	1928	906,032	172,895	*1,078,927
1926	620,936	154,393	*775,329	1929	1,097,459	206,026	*1,303,485

* Includes 174,000 tons of seamless steel boiler tubes in 1926, 157,205 tons in 1927, 147,742 tons in 1928, and 176,680 tons in 1929. Figures are not available prior to 1925.

PRODUCTION OF CAST-IRON PIPE AND FITTINGS, 1928–1929.

Kinds of pipe.	1928—Net tons.			1929—Net tons.		
	Pipe.	Fittings.	Total.	Pipe.	Fittings.	Total.
Gas and water*	1,315,198	56,129	1,371,327	1,238,177	54,929	1,293,106
Soil and plumbers.	362,901	137,792	500,693	266,435	91,050	357,485
Total	1,678,099	193,921	1,872,020	1,504,612	145,979	1,650,591

* Includes culvert pipe.

PRODUCTION OF CAST-IRON PIPE AND FITTINGS, 1924–1929.

Years.	Gas and water.*	Soil and plumbers.	Total. Net tons.	Years.	Gas and water.*	Soil and plumbers.	Total. Net tons.
1924	1,365,272	476,078	1,841,350	1927	1,490,590	481,638	1,972,228
1925	1,414,252	310,483	1,924,735	1928	1,371,327	500,693	1,872,020
1926	1,535,956	469,228	2,005,184	1929	1,293,106	357,485	1,650,591

* Includes culvert pipe.

PRODUCTION OF PLATES AND SHEETS BY KINDS, 1928–1929.

Kinds.	1928—Gross tons.			1929—Gross tons.		
	Iron.	Steel.	Total.	Iron.	Steel.	Total.
Universal plates*	1,018	1,303,338	1,304,356	3,127	1,422,173	1,425,300
Sheared plates—						
Rolled on single stands	.....	1,939,652	1,939,652	.....	2,855,941	2,855,941
Roughed and fin. on sep. stands	.....	669,620	669,620	.....	740,900	740,900
Black sheets rolled on sheet of job. mills	4,942	4,957,468	4,962,410	.....	5,254,998	5,254,998
Black plates, including black plates for tinning and black plate specialties rolled on tin mills	.....	2,130,012	2,130,012	.....	2,159,173	2,159,173
Total	5,960	11,000,090	11,006,050	3,127	12,433,185	12,436,312

* Include flats or bars over 6 inches wide.

PRODUCTION OF BLACK PLATES FOR TINNING, SHOWING IRON AND STEEL SEPARATELY, GROSS TONS, 1904–1929.

Years.	Iron.	Steel.	Total.	Years.	Iron.	Steel.	Total.
1904	2,981	469,588	472,569	1917	655	1,504,683	*1,505,338
1905	3,152	504,435	507,587	1918	.....	1,489,586	*1,489,586
1906	5,666	570,413	576,079	1919	144	1,144,457	*1,144,601
1907	3,161	500,911	504,072	1920	.....	1,449,330	*1,449,330
1908	2,954	510,817	513,771	1921	.....	786,962	*786,962
1909	4,261	602,221	606,482	1922	.....	1,266,652	*1,266,652
1910	2,893	709,244	712,137	1923	477	1,498,353	*1,498,830
1911	3,515	792,083	795,598	1924	.....	1,415,182	*1,415,182
1912	5,378	976,819	982,197	1925	.....	1,632,236	*1,632,236
1913	2,779	824,487	827,266	1926	.....	1,761,944	*1,761,944
1914	2,272	935,909	938,181	1927	.....	1,657,215	*1,657,215
1915	2,038	1,091,307	1,093,345	1928	.....	1,791,021	*1,791,021
1916	1,878	1,272,259	*1 274,137	1929	.....	1,698,640	*1,698,640

* Does not include black sheets rolled on sheet mills and used in the manufacture of long terne plates.

PRODUCTION OF WIRE RODS, GROSS TONS, 1898–1929.

Years.	Tons.	Years.	Tons.	Years.	Tons.	Years.	Tons.
1898	1,071,683	1906	1,871,614	1914	2,431,714	1922	2,654,741
1899	1,036,398	1907	2,017,583	1915	3,095,907	1923	3,075,892
1900	846,291	1908	1,816,949	1916	3,518,746	1924	2,522,545
1901	1,365,934	1909	2,335,685	1917	3,137,138	1925	2,844,656
1902	1,574,293	1910	2,241,830	1918	2,562,390	1926	2,722,032
1903	1,503,455	1911	2,450,453	1919	2,538,476	1927	2,770,271
1904	1,699,028	1912	2,653,553	1920	3,136,907	1928	3,080,816
1905	1,808,688	1913	2,464,807	1921	1,564,330	1929	3,134,409

Small quantities of copper-clad steel wire rods are included.

PRODUCTION OF HEAVY AND LIGHT STRUCTURAL SHAPES, GROSS TONS, 1918–1929.

Years.	Heavy shapes.	Light shapes.	Total.	Years.	Heavy shapes.	Light shapes.	Total.
1918	2,438,126	411,843	2,849,969	1924	2,805,084	478,624	3,283,708
1919	2,136,424	477,612	2,614,036	1925	3,049,817	554,313	3,604,130
1920	2,741,120	565,628	3,306,748	1926	3,330,572	581,091	3,911,663
1921	1,082,727	189,897	1,272,624	1927	3,083,211	659,234	3,742,445
1922	2,337,026	381,742	2,718,768	1928	3,408,545	687,598	4,096,143
1923	2,917,446	487,751	3,405,197	1929	4,055,615	722,405	4,778,020

Almost all heavy structural shapes are rolled from steel.

PRODUCTION OF CONCRETE BARS, SHOWING IRON AND STEEL CONCRETE BARS SEPARATELY, GROSS TONS, 1914–1929.

Years.	Iron.	Steel.	Total.	Years.	Iron.	Steel.	Total.
1914	.....	288,471	288,471	1922	696	575,120	575,816
1915	.....	353,408	353,408	1923	368	680,499	680,867
1916	2,683	458,717	461,400	1924	507	655,615	656,122
1917	1,497	469,687	471,184	1925	1,195	818,392	819,587
1918	468	344,152	344,620	1926	1,649	814,180	815,829
1919	2,295	416,726	419,021	1927	2,428	813,585	816,013
1920	698	571,747	572,445	1928	462	951,426	951,888
1921	1,094	226,134	227,228	1929	557	951,793	952,350

Replaces Fifty-Year Old Furnace

(*Concluded from page* 1751)

All surplus gas passes through an automatically controlled butterfly valve to a booster station, from which it is sent through a 5-ft. main to a 1,500,000-cu. ft. capacity dry-type gas holder, where the gas is stored preparatory to its distribution to the coke plant and the open-hearth furnaces. This cleaning plant is of sufficient capacity to clean the gas from two 600-ton blast furnaces. It is estimated that each blast furnace will produce 60,000 cu. ft. of gas a minute. Blast furnace gas from the holder is mixed with coke oven gas for use in the open-hearth furnaces. The mixing valve is located near the furnaces. A new battery of 45 coke ovens will be underfired with blast furnace gas, which will be drawn from the holder.

Cast-in Cooling Coil

This blast furnace is designed with eight sloping columns and 12 tuyeres. The cooling coil is cast in the jacket. The bosh, which measures 21 ft. 10 in. in diameter, is 10 ft. high. The bosh angle is 80 deg. 32 min.

Three stoves are furnished by turboblowers with 60,000 cu. ft. of air at 30 lb. per sq. in. pressure. These stoves are equipped with pressure burners and automatic hot-blast control. The insulation is 2½ in. thick. The hot-blast main and the bustle pipe are similarly insulated.

Two older furnaces, No. 1 and No. 2, each of 600 tons capacity, are retained. Hence the construction of the new No. 3 furnace and the dismantling of the old No. A furnace results in a net gain of 350 tons of pig iron a day. Aggregate capacity, which was 1450 tons, is now 1800 tons.

Progress in Brass and Bronze

(*Concluded from page* 1747)

Another man, however, reported having made tests with transformers of 100, 125 and 150 kva. on the same furnace, and having obtained results of 4000, 5000 and 6000 lb. of metal respectively in an 8-hr. day. Someone else gave corroborative evidence and stated as his belief that it certainly pays to use the heavier transformer capacity, even though the power cost for each ton of metal may be slightly raised thereby.

Good Working Conditions

Labor turnover on such furnaces was reported to be very slight. One man said he has had the same melting force at work during the entire eight or nine years the electric furnaces have been in operation. This was in sharp contrast with conditions when fuel-fired furnace fumes made it difficult to keep men on the job. Another man said his electric operators have been continually with him for at least ten years.

One other feature brought out was that there is likely to be little loss in power, or in costs, through undercharging a furnace. That means that a 350-lb. furnace may be charged with 200 lb. at not far from the same operating cost to the ton of the full charge. A caution was uttered, however, with regard to double charging, that is, melting the charge partly down and then adding more. This was reported to mean trouble and expense.

Frequently it is advisable to undercharge and thus maintain better synchronism with the production of molds on the molding floor. These must not be permitted to pile up, through having metal available at too infrequent intervals.

Induction-Type Furnace Conditions

Another of the shop operation sessions featured the induction-type electric furnace, specifically the Ajax-Wyatt. This was covered in units rated 30 to 240 kw., or 300 to 2200 lb. to the heat, using single-phase 60-cycle current at 200 to 450 volts. The power for melting was stated at 250 kwhr. to the (net) ton of metal and the total power, including holdover, 375 kwhr. Melting rate was given as 3 hr. to the ton.

Average operating costs from one plant's practice, with power figuring out at 1 2-3c. to the kwhr., were listed, based on a 5-day operation with a 9-hr. molding day, as follows:

Linings	$2.00
Coils	0.30
Charcoal	0.15
Power melting	4.25
Power holding	2.00
Power fan motor	0.04
Miscellaneous repairs	0.10
	$8.84

Priming the Furnace Before Melting

In operating this furnace, of which it was stated there are 453 in use in the United States and 334 elsewhere, it is necessary to preheat before charging. During the week a portion of the metal is left in, to avoid necessity for further preheating. This preheating takes 8 to 20 hr., depending on size, and costs about $10, average. Two burners or torches are used, one for the channel and one for the top of the "block," bringing the parts up to red heat.

As the metal is hotter than the lining, the latter does not wear away. On the contrary, it tends to build up, and has to be chipped out. Metal loss over a protracted period, as found by inventory, runs around 2 per cent. The "button" left between heats may be 200 lb. on the larger units.

Fifteen Ships to Be Scrapped

WASHINGTON, June 10.—Fifteen Shipping Board vessels with an aggregate of 133,683 deadweight tonnage have been sold to the Union Shipbuilding Co., Baltimore, for scrapping. The company's bid was $237,950. The vessels were laid up in the Hudson River.

Oglebay, Norton & Co. Win Mine Safety Award

A remarkable safety record in mine operations has been made by the Berkshire iron ore mine, Stambaugh, Mich., which for the second successive year has been awarded the bronze trophy, "Sentinels of Safety" by the United States Bureau of Mines. The award was made in the metal mine group of the National Safety Competition for the year 1929.

The Berkshire mine is operated by Oglebay, Norton & Co., Cleveland, and is owned by the Brule Mining Co. of which C. S. Robinson, vice-president, Youngstown Sheet & Tube Co., is president. The mine, employing 140 to 180 men, has been operated since May, 1927, with only one minor lost-time accident which occurred in December, 1927. The mine took 527,605 tons of iron ore from the ground in 1928 and 1929, during which there were 749,182 man hours consumed.

The "Sentinels of Safety" trophy has been in the possession of Oglebay, Norton & Co. for three years, their Bristol mine at Crystal Falls, Mich., having been adjudged winner for 1927.

Steel Foundries Census Taken by Association

The Steel Founders' Society of America, Inc., with headquarters at 932 Graybar Building, New York, has completed a census of the steel castings industry which has been published in a booklet of 170 pages entitled "1930 Directory of Manufacturers of Steel Castings, Heat and Corrosion-Resisting Castings in the United States and Canada." It gives the capacity, equipment, production data for 260 foundries in the United States and 17 in Canada. The summaries and statistical charts in the back of the book give a quick picture of various classifications in detail and total.

The survey shows that, while 1929 was a good year for the steel castings industry, the available capacity was not used in full, operations averaging 68 per cent.

Steel Merger Case Set for Early Hearing

YOUNGSTOWN, June 10.—Suit to permanently enjoin merger of the Bethlehem Steel Corporation and the Youngstown Sheet & Tube Co. will be heard shortly after June 28, it was decided by Common Pleas Judge David G. Jenkins, following arguments by attorneys for both groups in the controversy. Newton D. Baker, Cleveland, informed the court that he plans a trip abroad and would like to have the case assigned as soon as possible. Attorneys for C. S. Eaton, Cleveland, also expressed a desire to have the date advanced.

Britain May Curtail Steel Imports

Holiday Shutdowns in England Extended—Belgian Unemployment Worse—French Try to Exclude Pig Iron Imports

(*By Cablegram*)

LONDON, June 10.

IRON and steel markets have been closed over the holidays. Pig iron stocks are larger and the furnaces are willing to "break" £3 13s. 6d. ($17.88) for East Coast hematite, mixed numbers. Dorman, Long & Co., Ltd., Middlesbrough, closed the Cleveland Steel Works last week. Other makers are extending the holidays.

Clyde shipbuilding output in May consisted of 35 vessels launched, aggregating 55,000 tons, gross register.

Replying to a question in the House of Commons on June 6, the Government spokesman professed ignorance regarding the reported intention of the South African Government to place a large order for steel sleepers (railroad ties) with Belgian, French and German steel mills. He promised to make inquiry into it. Considerable orders it is said, are being negotiated, and the Government deprecated having such matters dealt with across the floor of the House.

Midland Bank's monthly trade review says: "Never since the great post-war slump has the [business] position been so depressing as at present."

Ordinary and preferred shareholders of John Brown & Co., Ltd., have approved the capital reorganization scheme. The meeting of the debenture holders has been adjourned until June 20.

Stewarts & Lloyds, Ltd., Glasgow and Birmingham, has acquired the four blast furnaces, with associated iron mines, of the Islip Iron Co., Ltd., near Thrapston. This was the only concern outside the Central Pig Iron Producers' Association.

Grängesberg Iron Ore Co., in Sweden, is reported to be forming a British subsidiary, styled Swedish Iron Ore Co.

Belgian market position is very bad and short-time employment is increasing, with further furnaces reported shut down. The price tendency is downward.

Continental Steel May Be Largely Barred from Great Britain by New Engineering Specification.

* * *

Chilean Steel Works May Be Under Construction by Next August, Krupp Furnishing Most of the Equipment.

* * *

Japanese Government Steel Works Applies for Patent on New Steel Piling.

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Short-Time Employment on Continent Is More Prevalent.

French pig iron producers are making special efforts to keep out imported supplies, by binding consumers to purchase only domestic material and offering special price concessions at points vulnerable to British competition.

New British Specification May Limit Steel Imports

LONDON, ENGLAND, June 2.—The new specification for steel issued by the British Engineering Standards Association (by cable to THE IRON AGE, May 22, page 1583) is of particular interest in that it omits all reference to the basic Bessemer process. The terminology of the paragraphs referring to "process of manufacture" is as follows:

(a) Steel shall be made by the open-hearth process (acid or basic), unless either process is required or specified, and shall not show on analysis more than 0.06 per cent of sulphur or of phosphorus.

(b) Steel may be made either by the open-hearth process (acid or basic) or by the Bessemer acid process, and shall not show on analysis more than 0.08 per cent of phosphorus, and not more than 0.06 per cent of sulphur.

By omitting basic Bessemer steel, the standard specification, when mentioned in contracts, will exclude the bulk of steel imported into Great Britain from the Continent. Prior to the new specification, basic Bessemer steel, although not sufficiently reliable for bridge construction, has been used extensively in other work, espe-

British and Continental European Export Prices per gross ton, f.o.b. United Kingdom Ports, Hamburg and Antwerp, with the £ at $4.8665 (par)

British Prices f.o.b. United Kingdom Ports

Ferromanganese, export	£10	15s.	to	£11	15s.	$52.30	to	$57.17
Billets, open-hearth	6	0	to	6	10	29.20	to	31.63
Black sheets, Japanese specifications	12	5				59.61		
Tin plate, per base box	0	18⅛	to	0	18½	4.46	to	4.50
						Cents a Lb.		
Steel bars, open-hearth	8	0	to	8	10	1.74	to	1.85
Beams, open-hearth	7	7½	to	7	17½	1.60	to	1.71
Channels, open-hearth	7	12½	to	8	12½	1.66	to	1.87
Angles, open-hearth	7	7½	to	7	17½	1.60	to	1.71
Black sheets, No. 24 gage	9	15	to	10	0	2.12	to	2.17
Galvanized sheets, No. 24 gage	11	17½				2.57		

Continental Prices, f.o.b. Antwerp or Hamburg

Foundry iron, 2.50 to 3.00 per cent sil., 1.00 per cent and more phos.	£3	2½s.	to	£3	3½s.	$15.21	to	$15.45
Billets, Thomas	4	13	to	4	14	22.63	to	22.87
Wire rods, low C., No. 5 B.W.G.	6	2	to	6	4	29.69	to	30.19
Rails, light	6	0				29.20		
Black sheets, No. 31 gage, Japanese	11	5	to	12	12	54.68	to	58.32
						Cents a Lb.		
Steel bars, merchant	5	7½				1.18		
Steel bars, deformed	5	6½	to	5	7½	1.17	to	1.18
Beams, Thomas, British standard	5	1	to	5	2½	1.11	to	1.14
Channels, Thomas, American sections	5	12	to	5	14	1.24	to	1.26
Angles, Thomas, 4-in. and larger, over ⅜-in. thick	5	6				1.17		
Angles, Thomas, 3-in.	5	7½				1.18		
Hoop and strip steel over 6-in. base	5	15				1.27		
Wire, plain, No. 8 gage	6	9				1.41		
Wire, barbed, 4-pt. No. 12 B.W.G.	10	10				2.28		
Wire nails, base	6	12½				$1.44 a keg		

cially in erection of steel-frame buildings. Construction of this class of building has grown, and the increased use of basic Bessemer steel has given rise to misgivings on the wisdom of such a policy, resulting in its exclusion from the new specification.

German Shipyards Seek Special Plate Prices

HAMBURG, GERMANY, May 26.—Shipyards here are urging the steel mills to grant special reductions in the prices of ship plates, pointing out that German shipping companies will not need to contract for additional vessels for the next 12 to 18 months and increased foreign business will be necessary. To secure such shipbuilding contracts abroad, especially in South American markets and the United States, lower material prices will be an important factor. Negotiations for special plate prices are to be entered into with the steel industry.

To Build Cable Plants in High-Tariff Countries

COLOGNE, GERMANY, May 27.—The Indeska G.m.b.H. has been formed here by the Interessengemeinschaft Deutscher Kabelwerke, an association of 75 per cent of the German producers of cables. The company plans to construct branch plants in countries with high tariffs on cables. At present plans are being considered for building in Spain, Portugal, Turkey, Canada and Japan.

Construction of Chilean Steel Works Begins Soon

ESSEN, GERMANY, May 24.—Reports that an iron and steel plant is to be constructed by the Government of Chile at Puerto Corral have been confirmed by the Friedrich Krupp A.G., which has the contract. A German and Chilean owned holding company has been formed with a capital stock of $3,600,000. Of the total Chilean share in the company, the Government has provided $1,000,000 and two Chilean financial interests the remainder. The Government has also placed a site at Puerto Corral at the disposal of the new company, and construction of the plant will be started late in July or early in August. The Krupp company will furnish most of the machinery and other equipment for the new works.

Krupp Company Scraps Blast Furnaces

ESSEN, GERMANY, May 24.—The Friedrich Krupp A.G. is dismantling the four blast furnaces at the Kruppsche Verwaltung der Muelhofener Huette, at Muelhofen near Engers. The last of the four furnaces has just been blown out.

Japanese Patent New Steel Piling

YOKOHAMA, JAPAN, May 10.—The Seitetsu Jo (Government steel works) at Yawata has applied for a patent on a new sheet steel piling which it has been developing. It is expected that the patent will be granted shortly and production will begin in the fall. Of total imports of steel piling last year of about 50,000 tons, Japan bought about 31,000 tons from Germany, 13,000 tons from the United States, and 6000 tons from a French producer.

Jugoslavia Buys German Typewriters

HAMBURG, GERMANY, May 26.—An order for 500 typewriters, to cost $50,000 delivered, has been placed on reparations account by the Jugoslavian Government. Since 1925 German manufacturers have shipped a total of 4000 typewriters to Jugoslavia in settlement of reparations.

Factory Earnings Lower

Average weekly earnings in representative New York State factories were $29.45 in April, according to the State Industrial Commissioner. This figure, which for all employees in both office and shop, is the lowest for any month since August, 1928. It represents a drop of 45c. from the March average and 62c. from that for April, 1929. It is $1.02 below the peak of $30.47, reached last September.

Sources of American Imports of Iron Ore

(In Gross Tons)

	April		Four Months Ended April	
	1930	1929	1930	1929
Canada	80	.....	150	162
Cuba	17,600	55,500	144,600	213,500
Chile	163,380	140,600	701,973	494,312
Spain	6,000	.....	34,483	18,368
Sweden	41,850	33,485	69,422	73,028
French Africa	21,725	30,620	77,545	59,180
Other countries	62,434	23,929	82,211	89,471
Total	313,069(a)	284,134	1,110,384	948,021

From United States Department of Commerce.
(a) Largest total since July, 1923.

Industrial Output Rose Slightly in April

Industrial production, according to an index compiled by the Federal Reserve Board, was 106 in April, compared with 105 in March. Both figures are much below the 122 of April, 1929. The same figures prevailed for the adjusted index of total manufactures, except that the figure for April, 1929, was 123. All figures are based on 100 as the average for 1923-1925.

Included in this group, iron and steel advanced from 112 in March to 114 in April, compared with 135 a year earlier. Automobiles remained uniform at 109 for both months this year, against 153 a year ago.

Commodity stocks are given as 136 in April, a reduction from the 141 of March and similarly above the 130 of April, 1929. While there was thus a reduction in the total commodity stocks, this was confined to raw materials, which declined from 152 to 142 between March and April, whereas stocks of manufactured goods went up from 125 to 128.

Unfilled orders dropped from 82 in March to 78 in April, against 93 a year earlier. In iron and steel the unfilled orders declined from 93 to 87 and in transportation equipment from 123 to 103.

Canada Provides Drawback on Seamless Pipe Billets

WASHINGTON, June 10.—The Canadian tariff changes, as finally passed by Parliament, provide a drawback of 99 per cent of the duty on steel billets when used in the manufacture of seamless pipe, tubes and flues intended for the manufacture or repair of pressure parts of boilers, pulp mill digestors and vessels for the refining of oil. The drawback also applies to billets when used in the manufacture of well-drilling machinery and apparatus. Amended items, according to a telegram received by the Department of Commerce from Commercial Attaché Lynn W. Meekins, Ottawa, include bars imported by manufacturers of chain; sheets for the manufacture of hollow ware coated with vitreous enamel; roller chain; copper and zinc sheets, ball bearings and gasoline engines and electric motors for use in the manufacture of washing machines or wringers and zinc strips.

The bill granting a bounty of 49½c. a ton on bituminous coal mined in Canada and used for making metallurgical coke was approved, as was the amendment to the special war revenue act providing for a reduction in the basic sales tax from 2 per cent to 1 per cent.

Stephens-Adamson Mfg. Co., Aurora, Ill., engineer and manufacturer of conveying and elevating machinery, has moved its New York sales and engineering office to 50 Church Street, room 1360.

Machinery Markets and News of the Works

Machine Tool Trade Slow

Orders and Inquiries Continue in About Same Volume as in Previous Weeks

MACHINE tool buying is in small volume, and the outlook for general improvement in the near future is not promising.

Inquiries are fewer in number, indicating possibly that many manufacturers are giving little thought to additions to or changes in plant equipment until the general business situation has taken a turn for the better.

Despite the dullness of the market as a whole, a few developments are on the brighter side. The Goodyear Tire & Rubber Co., Akron, Ohio, has issued an inquiry for about 25 metal and wood-working machines for the maintenance department of its South American plant, and at Chicago some fair-sized buying is in prospect from the steel companies. Purchases may soon be made also by the Allis-Chalmers Mfg. Co., Milwaukee, and the Caterpillar Tractor Co., Peoria, Ill.

New York

NEW YORK, June 10.—The situation in the Eastern machine tool markets has shown no change this month. Orders are few, and inquiries are also in restricted number. There are no signs of any general improvement during the next two or three months at least.

United States Potash Co., operated by Snowden McSweeney Co., 598 Madison Avenue, New York, is planning installation of mining and refining plant on potash properties in vicinity of Hobbs, N. M., for which a fund of about $1,000,000 has been arranged. Equipment will be electric-operated.

Long Island Ice Corporation, Stewart Avenue, Huntington, L. I., has plans under way for new one-story ice-manufacturing plant to cost over $150,000 with machinery. C. A. Conns is company architect and A. W. Conklin is president.

Bell Telephone Laboratories, Inc., New York, has awarded general contract to Stumpf & Hastings, 551 Fifth Avenue, for factory addition to cost over $200,000 with equipment. Voorhees, Gmelin & Walker, 101 Park Avenue, are architects.

Brooklyn Bed Spring Co., Brooklyn, has leased portion of six-story factory at 59 Irving Street, totaling about 150,000 sq. ft. floor space, for new plant for manufacture of wire bed springs and kindred products.

W. C. Sommerfeld, 31 Union Square, New York, architect, has plans under way for six-story automobile service, repair and garage building on Seventy-third Street, near Avenue A, to cost about $175,000 with equipment.

Continental Can Co., 1 Pershing Square, New York, has concluded arrangements for purchase of building on Grand Boulevard, Jacksonville, Fla., with about 30 acres of land, fronting on line of Southern Railway, for new branch plant. Present building will be equipped and new addition erected, reported to cost over $300,000 with equipment.

Department of Docks, Pier A, North River, New York, has secured an appropriation of $500,000 from Board of Estimate, for construction and completion of Floyd Bennett flying field at Barren Island, Brooklyn, including hangars, repair and reconditioning shops, etc.

Indian Refining Co., 17 State Street, New York, manufacturer of lubricating oils, gasoline, etc., is disposing of a note issue of $3,500,000, a portion of proceeds to be used for extensions and improvements, etc. Company is also planning increase in capital from 1,300,000 to 2,000,000 shares of stock, no par value.

American Potash & Chemical Corporation, 233 Broadway, New York, has approved fund of about $4,500,000 for expansion program at properties at Trona, San Bernardino County, Cal., including extensions in mining facilities, potash and borax refining plants, power plant and other units. Work is scheduled for completion in about 24 months.

United Color & Pigment Co., Evergreen Avenue, Newark, has awarded general contract to Adams-Faber Co., 247 Lorraine Avenue, Upper Montclair, N. J., for one-story addition, 49 x 105 ft., to cost over $30,000 with machinery. Robert Bolton, 45 Branford Place, Newark, is architect and engineer.

American Wood Lettering Co., Newark, recently organized by Casper J. Maier, an official of Maier Sign Co., 94 Stuyvesant Avenue, and associates, to manufacture store and office fixtures, etc., has leased building at 367-71 North Fifth Street, and will occupy for new plant. Mr. Maier will be secretary-treasurer of new organization; M. Felstels is president.

Department of Public Affairs, City Hall, Newark, is asking bids until June 16, for couplings, valves, tapping sleeves, brake lining and other mechanical equipment, as per specifications at office of Bureau of Purchases, Room 307, City Hall.

Newark College of Engineering, 367 High Street, Newark, is asking bids on general contract for a four-story industrial school at 110 Summit Street, estimated to cost over $100,000 with equipment. J. F. Scrimshaw, 526 Elm Street, Arlington, N. J., is architect.

War Department, Washington, has arranged an appropriation of $450,000 for new power house and other buildings at Picatinny Arsenal, near Dover, N. J., for which plans will soon be drawn and bids asked.

Standard Oil Co. of New Jersey, 26 Broadway, New York, has awarded general contract to Stone & Webster, Inc., 120 Broadway, for three-story addition at Bayway refining plant, Elizabeth, N. J., to be used for research, to cost over $175,000 with equipment.

J. C. Van Vlandren, 140 Market Street, Paterson, N. J., architect, will soon take bids on general contract for a two-story and basement automobile service, repair and garage building, 90 x 150 ft., on Nelson Avenue, Hawthorne, N. J., to cost about $140,000 with equipment.

Allied Products Corporation, Detroit, has leased building at 141 Frelinghuysen Avenue, Newark, N. J., for a factory branch. Company manufactures interchangeable piercing punches.

New England

BOSTON, June 10.—The dullness of the machine tool market the past week was emphasized by a noticeable slump in new possible prospects and by a meager correspondence with old prospects concerning tools under question. According to dealers, there is no inkling as to when a buying movement may be expected, and New England machine tool builders in general have less business on their books than at any time during the past year. One Rhode Island builder, in the interest of economy, has closed its foundry and is having castings made in Worcester, Mass. Other New England builders in some cases are operating plants on shortened schedule and in certain cases machinists have been temporarily discharged. Small tool sales have dropped off somewhat, reflecting a slowing up in metal-working shop schedules, which in normal times, however, is to be expected at this season.

State Board of Education, Hartford, Conn., has rejected bids recently received for new trade school at Meriden, for which an appropriation of $149,000 has been approved, and will receive new bids

on revised plans until June 16. Lorenzo Hamilton, Inc., Meriden, is architect.

Albree Marble & Tile Co., 9 Ashland Street, Dorchester, Boston, has plans nearing completion for new one-story plant, 100 x 100 ft., to cost about $60,000 with equipment. W. P. Hatch, 60 State Street, is architect.

Allan Mfg. & Electrical Corporation, Newark, N. J., has recently removed its entire plant to Lawrence; Mass., and plans to increase capacity.

Edison Electric Illuminating Co., Boston, has work nearing completion on new power substation at Cove and Pond Streets, Woburn, estimated to cost about $1,200,000 with machinery.

Board of Works, Springfield, Mass., plans early call for bids on general contract for a three-story and basement mechanical and repair shop, with equipment storage and distributing unit, estimated to cost close to $100,000 with machinery. McClintock & Craig, 458 Bridge Street, are architects.

Watson-Williams Mfg. Co., Leicester, Mass., has been organized to take over and consolidate L. S. Watson Mfg. Co., manufacturer of shuttles, heddles and other textile mill equipment, and J. H. Williams Co., Millbury, Mass., manufacturer of kindred textile mill apparatus. New company will continue production at same plants for same line of equipment, and will also operate mill at Marlow, N. H.

Southern New England Ice Co., Bridgeport, Conn., will install ice-manufacturing plant in building on Hallam Street; a permit has been secured to remodel and improve structure, and provide machinery, estimated to cost about $35,000.

Municipal Airport Commission, New Haven, Conn., has plans nearing completion for new airport, including hangars, repair and reconditioning shops and other mechanical units, reported to cost about $300,000 with equipment. Westcott & Mapes, 139 Orange Street, are architects.

Ford Motor Co., Dearborn, Mich., will soon begin production in new commercial car plant at Cambridge, Mass., and will remove motor truck division from plant at Somerville, Mass., to new location. New plant will develop increased output, with a greater variety of truck bodies.

Rodney Hunt Machine Co., Orange, Mass., manufacturer of textile machinery, water power equipment, etc., has concluded arrangements for purchase of Jefferson Kier, Inc., 189 High Street, Boston, manufacturer of bleaching kiers and other textile mill equipment, and will consolidate with organization. Acquired company will be removed to plant at Orange, where production will be continued as a new unit.

Kingsbury Machine Co., Keene, N. H., will shortly award a contract for a machine shop.

Charles G. Allen Co., Barre, Mass., foundry, is building a two-story, 50 x 80 ft. plant addition. Foundry equipment is under consideration.

Westcott & Mapes, Inc., New Haven, Conn., engineers, are taking bids on turbine and other equipment for a United Illuminating Co., Bridgeport, Conn., plant.

Thompson Products Co., Hartford, Conn., will organize an aeronautics division at its Cleveland plant for the exclusive manufacture of aircraft valves.

Vulcan Tool Mfg. Co., Quincy, Mass., granite cutting tools, has awarded a general contract for a manufacturing plant addition.

The Crane Market

A MODERATE volume of inquiry continues for locomotive cranes, but prospective buyers are inclined to await improvement in the business situation before placing orders. In the past week the John W. Cowper Co., Buffalo, closed on a combination crawl-tread crane and shovel with the Northwest Engineering Co.

In the overhead equipment field, there is a fair demand for small electric hoists, but inquiry does not include many large capacity crane installations. The Phoenix Utility Co., 71 Broadway, New York, is about to close on a 75-ton, 4-motor, overhead crane for Duluth, Minn., and is taking bids on a 40-ton, 4-motor gantry crane for Pittsburgh. In the Pittsburgh district the Weirton Steel Co. has closed on one 50-ton, three 15-ton cranes and a 25-ton bridge with the Shaw Electric Crane Co. The Bureau of Reclamation, Denver, Colo., opens bids June 18 on an 8-ton, hand-operated pillar jib crane with electric hoist.

Universal Winding Co., Cranston, R. I., has completed plans for a three-story, 60 x 160 ft. manufacturing unit and probably will award the general contract this month.

Rayon Equipment & Engineering Corporation, rayon machinery, has acquired the plant formerly owned by the Bridgeport Engineering Co., Bridgeport, Conn. New manufacturing equipment is under consideration.

The Providence Engineering Works, Providence, R. I., dealing in engines and machinery, has reorganized as the Providence Engineering Works, Inc., with a capital or $75,000 preferred shares and 2000 shares of no par common stock.

Philadelphia

PHILADELPHIA, June 9.—Barber Asphalt Co., Insurance Co. of North America Building, Philadelphia, has awarded general contract to Morrison & Sherman, Inc., 675 Garden Street, Elizabeth, N. J., for two-story laboratory and engineering building at Maurer, N. J., to cost about $100,000 with equipment. Day & Zimmermann Engineering Co., 112 North Broad Street, Philadelphia, is architect and engineer.

Pennsylvania Railroad Co., Philadelphia, has awarded contract to George A. Fuller Co., Morris Building for one-story machine and repair shop, with facilities for equipment storage and distribution at Forty-eighth Street and Parkside Avenue, to cost about $60,000. William H. Cookman is company architect. An engine house and other units to cost about $180,000 will be erected at same location.

Firestone Tire & Rubber Co., Akron, Ohio, has awarded general contract to Conneen Construction Co., 770 Schuylkill Avenue, Philadelphia, for one-story factory branch and distributing plant at Chelten and Wayne Avenues, Philadelphia, to cost about $100,000 with equipment.

Franklin Institute, 15 South Seventh Street, Philadelphia, identified with Benjamin Franklin Memorial and Franklin Institute Museum, has secured a fund of $30,000 for installation of a museum of testing machinery in engineering division of new unit. Entire project will cost about $5,000,000.

United Gas Improvement Co., 1401 Arch Street, Philadelphia, operating Philadelphia Electric Co., and other light and power utilities, has acquired Wilmington Gas Co., Wilmington, Del., with assets of $8,000,000; Atlantic City Gas Co., Atlantic City, N. J., with properties valued at $9,000,000; and Peoples Gas Co. of New Jersey, operating in South Jersey, with assets of $4,000,000, and will consolidate with organization. Expansion and improvements are planned in plants and systems, including pipe line construction.

Eugene A. Stopper, Fuller Building, Philadelphia, architect, has filed plans for an automobile service, repair and garage building at Cheltenham Avenue and Bustleton Pike, to cost about $100,000 with equipment.

Following recent purchase of control of Indian Motocycle Co., Springfield, Mass., by du Pont Motors, Inc., Commerce and Dock Streets, Wilmington, Del., last-noted organization has begun removal of plant to Springfield, where production of du Pont automobiles will be concentrated. Motorcycle manufacture will be continued as heretofore.

Commissioner of Institutions and Agencies, William J. Ellis, State Office Building, Trenton, N. J., is asking bids until June 20 for stoker, boiler, coal and ash-handling equipment, and auxiliary equipment for power house at Institution at Skillman.

F. Giovannozzi & Sons, Eleventh and Lincoln Streets, Wilmington, Del., operating a stone-cutting and finishing plant, have work under way on new one-story plant, 45 x 125 ft., on Market Street Causeway, with cranes and other material-handing equipment, where increased production will be carried out.

Brown Instrument Co. has let a contract for 40,000 sq. ft. of additional floor space to Robert E. Lamb Co., Philadelphia, Pa. Mechanical and electrical equipment will be installed under separate contracts.

South Atlantic

BALTIMORE, June 9.—Hinde & Dauch Paper Co., Sandusky, Ohio, manufacturer of corrugated paper containers, has plans in progress for new one-story plant on land recently acquired on Biddle Street, Baltimore, 240 x 480 ft., estimated to cost over $350,000 with machinery. Otto Randolph, Inc., 53 West Randolph Street, Chicago, is architect and engineer.

Cassco Ice Co., Cold Storage Division, Charlottesville, Va., has approved plans for new cold storage and refrigerating plant at Waynesboro, Va., to cost over $250,000 with machinery. J. M. Rothwell is manager.

Stewart & Co., Charles and Lexington Streets, Baltimore, department store, will soon take bids on general contract for a two-story automobile service, repair and garage building at 641 West Saratoga Street, for company use, to cost over $100,000 with equipment. Joseph E. Sperry, Calvert Building, is architect.

United States Coast Guard Headquarters, Washington, will receive bids until June 20 for one all-purpose crane tractor for service at depot at Curtis Bay, Md. Also, until June 16, for a quantity of steel oil tanks, including 125 65-gal. units; 125 110-gal. units; 165 120-gal. units; and 90 280-gal. tanks.

Southern Quarries, Inc., Elberton, Ga., is planning one-story unit at plant, 45 x 200 ft., to be equipped with electric traveling crane of 20-ton capacity and other handling equipment.

DuPont Cellophane Co., River Road, Buffalo, a subsidiary of E. I. duPont de Nemours & Co., Wilmington, Del., will begin superstructure at once for new plant at Ampthill, near Richmond, Va., consisting of several units for manufacture of special moisture-proof wrapping papers, estimated to cost over $3,000,000 with machinery. Project will include a machine shop and other mechanical units. DuPont Engineering Co., duPont Building, Wilmington, is engineer.

State Prison Department, Richmond, Va., will make extensions and improvements in factory No. 1, at State penitentiary on Spring Street, to cost about $75,000.

Board of School Commissioners of Wicomico County, Salisbury, Md., plans installation of manual training equipment in new three-story high school on Main Street, to cost about $275,000, for which general contract has been let to Cogswell Construction Co., 406 Park Avenue, Baltimore.

United States Cold Storage Co., Kansas City, Mo., has awarded a general contract to E. W. Sproul Construction Co., 2001 West Pershing Road, Chicago, for new multi-story cold storage and refrigerating plant at Atlanta, Ga., to cost over $650,000 with machinery. A. Epstein, 2001 West Pershing Road, Chicago, is architect and engineer.

Chesapeake & Ohio Railroad Co., Richmond, Va., has awarded general contract to W. Horace Williams Co., New Orleans, La., for new coal pier on waterfront at Newport News, Va., 1000 ft. long and 70 ft. wide, to be equipped with cranes, elevating, conveying, loading and other material-handling equipment. It is scheduled for completion in 7 months and will cost about $1,500,000 with machinery. C. W. Johns is chief engineer.

Glenn L. Martin Co., Baltimore, has secured a contract from Navy Department for 25 flying boats and spare parts, totaling $1,400,000 and will develop maximum capacity in this division of plant. Other unfilled orders on hand for different types of aircraft insure full capacity in all departments until next spring.

Augusta Arsenal, Augusta, Ga., is asking bids until June 23, for one portable, motor-driven, universal saw machine.

Pittsburgh

PITTSBURGH, June 9.—Machine tool and machinery business again in the past week has been rather slow. Both orders and inquiries have been few. Buyers do not seem to feel any urgency about purchases in view of the fact that steel demand and production are on a tapering scale and the prospect is that there will not be any substantial upturn during the summer months. Orders in the first five months of this year to dealers serving the Pittsburgh district are estimated to have been from 65 to 70 per cent of those of the same period last year. The Midwest Steel Corporation, subsidiary of the National Steel Corporation, has not yet started to take preliminary bids for estimating purposes, but will probably begin to do so before the end of summer.

Department of Public Works, City-County Building, Pittsburgh, is asking bids until June 16, for a steam turbine-driven centrifugal boiler feed pump and accessories for Ross pumping station; also for a steam-driven air compressor for Herron pumping station, as per specifications on file.

H. J. Heinz Co., 1062 Progress Street, Pittsburgh, canned goods, contemplates new plant at Winchester, Va., for manufacture of apple products, including automatic canning machinery, conveying equipment, etc., reported to cost over $150,000. Company has also awarded general contract to W. B. Eaton Construction Co., Lockport, N. Y., for one-story canning factory at Medina, N. Y., 126 x 175 ft., to cost close to $100,000 with machinery.

Board of School Directors, Borough of Bellevue, Bellevue, Pa., is asking bids until June 23, for stokers for local high school, as per specifications at office of Nelson Mowls, superintendent. James W. Graham is secretary.

Ford Motor Co., 5000 Baum Boulevard, Pittsburgh, with headquarters at Dearborn, Mich., has leased space in building at Morewood Avenue and Baum Boulevard, totaling 30,000 sq. ft., and will use for factory branch for parts service, including repair and installation facilities.

Manufacturers' Light & Heat Co., Union Trust Building, Pittsburgh, has acquired pipe line system of Southern Pipe Line Co., extending from West Virginia to Millway, Pa., and vicinity, used for oil service, and will use for proposed extensions in operations in that territory. Installation of other pipe lines is under consideration.

Marion Glass Co., Shinnston, W. Va., is considering rebuilding of portion of plant recently destroyed by fire, with loss reported over $50,000 including equipment.

Buffalo

BUFFALO, June 9.—Simonds Saw & Steel Co., Lockport, N. Y., has awarded general contract to Morris & Allan, Inc., Jackson Building, Buffalo, for one-story addition to be equipped for production of stainless steel, to cost over $250,000 with machinery; cold rolling equipment will be installed. William G. Merriman is general manager.

State Department of Education, Education Building, Albany, N. Y., has plans under way for vocational training school at State normal school, Oswego, N. Y., to cost about $300,000 with equipment. William E. Haugaard is State architect, in charge.

S. B. Whistler & Sons, Inc., 1459 Niagara Street, Buffalo, general machinist, has permit for a one-story machine shop at 752-4 Military Road, to cost close to $30,000 with equipment.

Pure Oil Co., Wabash Avenue and Wacker Drive, Chicago, is planning establishment of large storage and distributing plant at Syracuse, N. Y. Negotiations are under way for purchase of local properties of C. E. Mills Oil Co., in connection with development and expansion program, project to cost close to $1,000,000.

Board of Education, Niagara Falls, N. Y., plans manual training equipment in three-story junior high school on Hyde Park Boulevard, to cost about $750,000, for which it is expected to ask bids on general contract in July. Cannon & Kirkpatrick, United Office Building, are architects.

Lackawanna Steel Construction Corporation, Walden Avenue, Buffalo, has filed plans for a one-story shop unit for fabricating service at 199 Dorothy Street, including facilities for storage and distribution, to cost about $35,000 with equipment.

Toddy, Inc., 8 Jay Street, Rochester, N. Y., is planning rebuilding of portion of beverage manufacturing and bottling plant at Watts Flats, near Rochester, destroyed by fire June 2, with loss estimated at $100,000 including machinery, conveying and other mechanical equipment.

Detroit

DETROIT, June 9.—Holland Furnace Co., Columbia and Thirty-second Streets, Holland, manufacturer of heating equipment for domestic service, contemplates a new addition to cost close to $100,000 with machinery.

Overcashier Aircraft Mfg. Co., 13095 Greeley Street, Detroit, is planning an expansion program with considerable increase in present production facilities, including equipment for manufacture of a new type of seamless steel tube frame monoplane. Company has arranged for an increase of $125,000 in capitalization to provide funds for work. Frank A. Overcashier is president.

Wilcox-Rich Corporation, Rust Street, Saginaw, manufacturer of valves and other equipment for automobiles, has plans under way for new one-story addition to cost about $75,000; another unit of about same cost is also under consideration. Cowles & Mutcheller, Adams Building, are architects.

AC Spark Plug Co., Flint, is arranging for increased production facilities for manufacture of recently perfected mica-insulated spark plugs for aircraft service and plans to develop large commercial output in that line. Harlow H. Curtice is president.

Ohio Steel Foundry Co., Bay City, has awarded general contract to Henry C. Webber Construction Co., Bay City, for one-story foundry addition to cost about $50,000 with equipment. Other expansion will also be carried out at plant.

Muskegon Motor Specialties Co., Muskegon, has concluded arrangements for a consolidation with Jackson Motor Shaft Co., Jackson, and latter will be operated in future as unit of organization. Proposed to maintain Jackson plant at present location. Otto H. Schultz, president of Jackson company, will become vice-president of Muskegon company.

American Enameled Magnet Wire Co., Muskegon, is arranging fund of over $75,000 for extensions and improvements in plant for Port Huron Engine & Thresher Co., Port Huron, recently acquired for new main plant. Last-noted company is now in receivership, and approval of court for transfer of plant is expected soon. Present works will be removed from Muskegon to new location and capacity increased for enameled wire specialties for automotive, electric and radio service. Company is a subsidiary of Electric Auto-Lite Co., Toledo, Ohio; J. A. Minch is president.

Birmingham Sash & Door Co., Birmingham, is planning rebuilding of portion of millwork manufacturing plant recently destroyed by fire with loss of about $50,000 including equipment.

Officials of Chris Smith & Sons Boat Co., Algonac, manufacturer of motor boats and other craft, are organizing new company under name of Chris-Craft Corporation to take over and expand present organization. Additional financing will soon be arranged to provide funds for expansion in production and distributing facilities. Chris Smith will be chairman of board of new company; Jay W. Smith will continue as president and general manager.

Motor Wheel Corporation, Lansing, manufacturer of wire wheels, etc., for automobiles, has arranged for purchase of controlling interest in Cleveland Welding Co., West 117th Street and Berea Road, Cleveland, manufacturer of steel rims for car and truck wheels, welded products, etc., and will be active in management in future. Cleveland plant will be continued at present location and present organization retained. W. H. Kranz is president of Cleveland Company, and C. S. Holden, vice-president.

Cleveland

CLEVELAND, June 9.—Machine tool market in this territory shows little change. Sales were light during the week and confined to single machines and not much new inquiry is coming out. The only inquiry of any size is from the Goodyear Tire & Rubber Co., which is in the market for about 25 metal and woodworking machines for the maintenance department of its South American plant. Its list includes lathes, grinders, planers and drilling and milling machines. Used tools may be purchased in some cases. The Owen Bucket Co., Cleveland, purchased a large multiple-spindle drilling machine. The U. S. Army Air Corps, Wright Field, Dayton, Ohio, took bids today for four 16-in. x 8-ft. and one 18-in. x 10-ft. lathes. The Cooper-Bessemer Corporation, Mount Vernon, Ohio, has received an order for more than 15 1000-hp. compressors for the Missouri-Kansas Pipe Line Co. for use in connection with its new natural gas pipe line development.

Fisher Body Co., Coit and East 140th Streets, Cleveland, a division of General Motors Corporation, has approved plans for one-story addition to local plant, 85 x 400 ft., to be used for die-stamping service, estimated to cost over $300,000 with equipment. Company will also build new shipping pier, 30 x 100 ft., with mechanical-handling facilities.

Capitol Foundry Co., Marysville, Ohio, is planning rebuilding of portion of foundry recently destroyed by fire with loss reported over $35,000 including equipment.

Glidden Co., Madison Street, N. W., Cleveland, manufacturer of paints, varnishes, etc., has arranged for a note issue to total $6,000,000, portion of fund to be used for expansion.

Euclid Machine & Engineering Co., 1838 Noble Road, Cleveland, has awarded general contract to R. Hansen Construction Co., 9323 Sandusky Avenue, for one-story addition, 75 x 100 ft., to cost over $50,000 with equipment. Edward G. Hoefler, 5005 Euclid Avenue, is architect.

Toledo Lumber & Millwork Co., 201 South St. Clair Street, Toledo, Ohio, is said to be planning rebuilding of portion of plant recently damaged by fire.

Machinery, materials, etc., of Banting Mfg. Co., 2401 Dorr Street, Toledo, Ohio, will be sold at public auction June 25 by Industrial Plants Corporation, 25 Church Street, New York. Descriptive circulars are now available.

Land and buildings, machinery, supplies and all equipment of Fulton Pit Car Co., Canal Fulton, near Massillon, Ohio, will be offered at public auction June 24 by Industrial Plants Corporation, liquidators, 25 Church Street, New York. Detailed catalogs are now available.

Owing to demand for electric fans, Peerless Electric Co., Warren, Ohio, is operating night and Sunday shifts to replenish depleted stocks. Company also reports a good demand for small horsepowered motors.

United States Gypsum Co., Chicago, expects to select a location in Youngstown district for a plant which will house the fireproofing building products department which it purchased from the Youngstown Pressed Steel Co. At present, this department is occupying space leased from the latter.

Corrigan-McKinney Steel Co., 3100 East Forty-fifth Street, Cleveland, is considering new one and two-story addition, 100 x 125 ft., to cost close to $100,000 with equipment. An electric traveling crane and runway will be provided.

Republic Steel Corporation, Market Street Viaduct, Youngstown, Ohio, has awarded a contract to Chapin Construction Co., 1440 Louisiana Avenue, Canton, Ohio, for one-story addition to plant at Canton, to cost about $35,000 exclusive of equipment.

Chicago

CHICAGO, June 9.—The first week in June marks an important change in the local machine tool market in that scattered sales resulting from fresh inquiries are on a measurably higher level than in the past several months. Old requests for prices still move sluggishly. The present situation leads dealers to anticipate that the early summer may not prove as dull as might have been expected in view of developments in April and May. The Milwaukee Road has completed purchases against its car shop list. Little business is pending from the railroad, purchases by which have been light all Spring. Several Chicago steel mills are preparing to enter the market, and purchases may soon be made by Allis-Chalmers Mfg. Co., Milwaukee, and Caterpillar Tractor Co., Peoria, Ill.

Tobin Tool & Die Co., Fond Du Lac, Wis., manufacturer of standard screws and specialties, is building a plant addition, 50 x 50 ft.

Wilbar Mfg. Co., manufacturer of special machinery, has located in Chesterton, Ind., having outgrown its former quarters at Ogden Dunes, Ind.

Automatic Burner Corporation has moved to its new factory at 1823 Carroll Avenue, Chicago.

Pekin Foundry & Mfg. Co., Pekin, Ill., heavy and light gray iron, semi-steel and nickel alloy castings, has added a new and improved line of garage and shop equipment to its products, including tire changing machine, armature testing stand, gear puller, groove cleaner and caster jack.

Hess Warming & Ventilating Co., 1207 South Western Avenue, Chicago, manufacturer of heating and ventilating equipment, will soon take bids on general contract for a two-story addition to cost close to $90,000 with machinery. W. H. Tomlinson, Morris Building, Joliet, Ill., is architect.

Commonwealth Edison Co., 72 West Adams Street, Chicago, has made application for permission to dispose of a new bond issue in amount of $12,000,000, portion of proceeds to be used for expansion and improvements in power plants and system, including transmission line construction.

Brazil Stamping & Mfg. Co., 3244 West Lake Street, Chicago, manufacturer of metal stampings, etc., has arranged for lease of one-story factory at West Sixty-fifth Street and Laramie Avenue, totaling about 25,000 sq. ft. of floor space, and will use for expansion.

Borden's Farm Products Co. of Illinois, 326 West Madison Street, Chicago, plans installation of automatic bottling machinery, refrigerating equipment, conveying and other mechanical-handling equipment in new three-story bottling plant on West Seventieth Place, estimated to cost about $325,000 with machinery. E. E. & E. C. Roberts, 105 North Clark Street, are architects.

LaPlant-Choate Mfg. Co., Cedar Rapids, Iowa, manufacturer of steel dump wagons, trailers for farm tractors, etc., will begin erection of two one-story and basement additions, 128 x 140 ft., and 46 x 100 ft., to cost over $60,000 with equipment.

Oliver Power Co., an interest of Oliver Coal Co., Paonia, Colo., is arranging plans for a steam-operated electric power plant in vicinity of coal-mining properties, to cost about $200,000 with machinery. A transmission line will be built for service in different parts of North Park Valley.

Board of Education, Minneapolis, Minn., will remodel and improve a four-story factory at Broadway and Jackson Street, N.E., for a new equipment storage and distributing plant, with mechanical repair shop, estimated to cost over $85,000. Bureau of Buildings, Division of Design and Inspection, 245 Ninth Avenue North, is architect and engineer. George F. Womrath is business superintendent.

Jacob Friedlander Furniture Co., 181 East Sixteenth Street, Chicago Heights, Ill., is said to be arranging early call for bids on general contract for a five-story addition at Sixteenth and Center Streets, to cost about $230,000 with machinery. Ned I. Sosna, 185 North Wabash Avenue, Chicago, is architect.

Milwaukee

MILWAUKEE, June 9.—The quiet aspect of the machine tool market continues. While inquiry is fair, it is not so active as it was in the earlier months of the year. Buying remains confined to replacement needs, and while these are relatively plentiful, the market lacks the aggressiveness of new buying for extensions of capacity and production.

John Lauson Mfg. Co., New Holstein, Wis., manufacturer of farm and road tractors, gasoline engines, snow traveling attachments for automobiles, and similar equipment, has been reincorporated in Wisconsin as the Lauson Corporation. Capital of the new corporation consists of common stock to the value of $522,988.58, and $100,000 preferred stock. F. D. Edson is president; H. N. Edens, vice-president, and Clifford O. Piper, secretary-treasurer.

Common Council of South Milwaukee, Wis., has placed contract with Allis-Chalmers Mfg. Co., Milwaukee, for one

4,000,000-gal. per day pumping engine, with motor and controls.

Reinke-Schomann, Inc., Milwaukee, has been organized with Fred Schomann as president, and Herman Reinke, secretary-treasurer, to manufacture general line of sheet metal products. Factory and offices are at 949 North Water Street.

Plans are being prepared by A. T. Petelinz, 192 Fourth Street, Milwaukee, for a three-story industrial and pathological research building, 100 x 250 ft., costing about $200,000 complete. Location and name of owner and occupant are being withheld for the present.

Common Council of Antigo, Wis., has accepted bid of Chicago Bridge & Iron Works, Chicago, for furnishing and installing a 150,000-gal. steel water storage tank, mounted on a 130-ft. steel tower, at $13,960.

John Peterson Mfg. Co., Madison, Wis., has been incorporated by John Peterson and associates to engage in business as general machinist and to build tools, dies, jigs and special machinery. The capitalization consists of $25,000 in common and preferred shares.

Northern Conveyor & Mfg. Co., Janesville, Wis., which is completing a substantial addition to its plant, is placing in production a full line of portable conveyors for loading freshly mined coal from the floor of the veins in the mine to cars carrying material to the elevators. Electric motor power is employed.

Milwaukee Electric Crane & Hoist Corporation, a division of Harnischfeger Corporation, Milwaukee, is recalling practically all men temporarily dismissed, increasing the payroll to upward of 200. Increase is due to good demand for a new line of small I-beam trolley hoists recently announced. The new crane is being placed on a production basis.

Wisconsin Radiator Furniture Co., Mayville, Wis., manufacturer of ornamental metal radiator covers for homes, offices, etc., and other stamped and perforated sheet metal products, has engaged Arthur Kuenzi, consulting engineer, Watertown, Wis., to design a shop addition to cost about $30,000.

Layne-Northwest Co., 1023 Wells Street, Milwaukee, is successful bidder at $10,613 for pumping, booster and control equipment for new No. 6 well at Blanchard Street pumping station in Wauwatosa, suburb of Milwaukee.

Bay View Chevrolet Co., 1008 Kinnickinnic Avenue, Milwaukee, has broken ground for a new sales and maintenance station, 83 x 135 ft., costing $40,000 at 1120-1126 Kinnickinnic Avenue.

Oliver Mining Co., Ironwood, Mich., has purchased the old Union Hospital, three stories, 75 x 80 ft., with two wings, 30 x 35 ft., and will remodel it into a general office building at a cost of $25,000 or more.

Public Utility Commission, Sturgeon Bay, Wis., has placed contracts for three Iron Fireman steam turbines with full automatic stokers; three 165-hp. Freeman boilers and one Worthington water heater for an addition to the municipal light and waterworks plant. J. B. Johnson is superintendent.

J. F. Devine Pattern & Mfg. Co., 535 Fifty-sixth Avenue, West Allis, Milwaukee, has started work on a shop addition costing about $10,000 complete.

Milwaukee Valve Co., 139 Burrell Street, Milwaukee, has placed contract with Ed. Steigerwald & Co., 5310 State Street, for alterations and addition to its plant.

George H. Smith Steel Casting Co., Milwaukee, has under construction several new units, first of which will house company's tractor equipment division, the Trackman Co. The first new building, 150 x 200 ft., will serve as a machine shop and assembly department. F. E. Hinners is president of both companies.

Cincinnati

CINCINNATI, June 10.—The steady flow of small quantity orders for lathes is the only feature of the district market. While this demand, of course, does not warrant the stepping up of production to capacity, it has enabled lathe builders to sustain production at about 65 to 70 per cent of capacity. Other lines of tools, however, are experiencing a sluggish demand and production in these is noticeably off. In many instances manufacturers are seizing the opportunity to replenish stocks, which in the briskness of business last year were depleted. Unfilled orders have been practically wiped out and district factories are dependent upon current bookings to sustain operations. Interest by way of inquiry continues to be good.

City Purchasing Agent, Hamilton, Ohio, is asking bids until June 16, for annual municipal requirements for electric meters for fiscal year beginning June 23, as per specifications on file.

Board of Education, Covington, Ohio, is considering installation of manual training equipment in new three-story high school to cost about $170,000, for which plans have been completed by Marlay W. Lethley, Tecumseh Building, Springfield, Ohio, architect.

Smith Motor Coach Co., Washington Avenue and Front Street, Memphis, Tenn., has asked bids on general contract for a two-story plant, 85 x 175 ft., for manufacture of motor bus bodies, to cost close to $100,000 with equipment. Jones & Furbringer, Porter Building, are architects. Frederick Smith is president.

Board of Trustees, West Tennessee State Teachers' College, Memphis, Tenn., has plans nearing completion for new science and engineering building to cost $225,000 with equipment. George Mahan, Jr., American Bank Building, is architect.

Materiel Division, Air Corps, Wright Field, Dayton, Ohio, will receive bids until June 16, for two air compressors.

City Council, Owensboro, Ky., is considering extensions and improvements in municipal electric light and power plant, including installation of additional equipment, for which bids will soon be asked. Froelich & Emery Engineering Co., Toledo, Ohio, is engineer.

Spottswood Specialty Co., 218-22 Jefferson Street, Lexington, Ky., manufacturer of advertising novelties and specialties, is planning one-story addition, 25 x 170 ft., with installation of additional equipment for enlarged output. A. T. Linney is vice-president.

Cities Service Co., Springfield, Ohio, has approved plans for a one-story oil compounding plant, with storage and distributing facilities, totaling about 300,000 gal. capacity, estimated to cost over $85,000 with equipment.

Gustave Fox Co., Cincinnati, manufacturer of embossed and enameled name plates, has changed its name to Fox Co. Leonard J. Fox is president and Milford G. Fox, vice-president.

Gulf States

BIRMINGHAM, June 9.—Dallas Power & Light Co., Dallas, Tex., has secured permission from City Commission for construction of artificial lake, 4½ mi. long and 1½ mi. wide, at Mountain Creek, to provide water supply for proposed new steam-operated electric generating plant to be built in same section. New station will be equipped for initial capacity of 35,000 kw. Entire project, including lake and transmission lines, is estimated to cost close to $7,000,000. Company engineering department will be in charge.

Board of Education, Homeward, Ala., has authorized installation of manual training equipment in proposed addition to Shades Cahaba high school, for which plans are being drawn by Ben Price, Comer Building, Birmingham, architect.

General Foundry Co., Anniston, Ala., plans rebuilding of portion of plant recently destroyed by fire with loss estimated at $35,000 including equipment.

Indian River Shipyard, Inc., Fort Pierce, Fla., recently organized by Charles J. Dougherty, St. Lucie County Bank Building, Fort Pierce, and associates, will proceed with installation of local shipyard and plant for construction and repair of vessels of different kinds, primarily speed craft, house boats, etc. Waterfront site has been selected. Proposed to have plant ready for service early in fall, reported to cost over $65,000 with equipment.

Swann Corporation, Birmingham, headed by Theodore Swann, has organized a new subsidiary under name of Swann Chemical Co., with capital of $1,000,000, to take over and consolidate Southern Manganese Corporation, Southern Manganese Mining Corporation, Southern Manganese Land Co., Federal Fertilizer Co., Federal Phosphorus Co., Federal Carbide Co., and Jax Plant Food Co., all operating in Alabama and vicinity. New company will group acquired properties and will operate as individual units. Expansion is planned for increased capacity. Mr. Swann will be president of chemical company.

In connection with expansion and improvement program to cost $1,600,000, recently started, West Texas Utilities Co., Abilene, Tex., is planning construction of large steam-operated electric generating plant at Dalhart or vicinity, reported to cost over $400,000 of total fund noted. Company will make transmission line and power substation extensions, and will also proceed with new ice-manufacturing plant at Dalhart.

City Council, Shreveport, La., has approved plans for municipal airport and will proceed with project at once, including one-story hangar unit, 100 x 100 ft., with repair and reconditioning facilities, three-story administration building and other structures. Entire project is reported to cost over $100,000 with equipment. Olschner & Weiner, Ardis Building, are supervising architects.

City Council, Hazlehurst, Miss., is planning construction of a municipal electric light and power plant, reported to cost over $50,000 with machinery. Culley-O'Brien Engineering Co., Inc., Jackson, Miss., is engineer, in charge.

William Twyan, Greenville, Miss., and associates have organized a new company to establish and operate a local cotton compress plant. Company has taken over building previously occupied by Churchill Compress Co., and will remodel and install equipment at once. Plant will be

equipped for initial output of 25,000 to 30,000 bales per day, and is to cost close to $185,000 with machinery. L. R. Foote, J. A. Lake, Jr., and A. G. Paxton, all of Greenville, are interested in new company

Community Ice Co., Goose Greek, Tex., has purchased local site and plans construction of one-story ice-manufacturing and refrigerating plant to cost about $65,000 with machinery.

Board of Education, Monroe, La., will install manual training equipment in new three-story high school to cost $450,000, for which bids are being asked on general contract until June 30. J. W. Smith & Associates, Ouachita National Bank Building, are architects.

Gulf Pipe Line Co., Fort Worth, Tex., a subsidiary of Gulf Oil Co., with refining plant at Port Arthur, Tex., is planning construction of new pipe line from Darst oilfield in Guadalupe County to connect with Port Arthur trunk line at Sour Lake, to cost over $400,000 with equipment.

Reynolds Metals Co., Thirtieth and Grand Streets, Louisville, has concluded negotiations for purchase of Lehmaier, Schwartz & Co., manufacturers of tin, aluminum and other foils, and kindred metallic specialties, with main four and eight-story plant at 511-39 West Twenty-fifth Street, New York, and two large branch factories at Glendale, L. I., on 12 acres of land, designed primarily for production of aluminum foils, and at Richmond, Va., used for other metal foils, respectively. Purchasing company will take over property at once and will operate as new unit in organization, continuing manufacture at all acquired plants.

Indiana

INDIANAPOLIS, June 9.—United States Radio & Television Co., Marion, manufacturer of radio equipment, etc., has awarded general contract to Bowman Construction Co., Marion, for one-story addition, 100 x 300 ft., to cost about $50,000 with equipment. A. E. Chase is manager.

Board of Public Works, East Chicago, Ind., has plans under way for a municipal electric light and power plant to cost over $75,000 with machinery. Burns & McDonnell Engineering Co., Interstate Building, Kansas City, Mo., is engineer. L. B. Campbell is city engineer.

Connersville Blower Co., Inc., Connersville, manufacturer of mechanical draft equipment, gas pumps, etc., has begun work on a one-story addition, 25 x 125 ft., to cost close to $50,000 with equipment. Increased capacity will be arranged.

Board of School Commissioners, 150 North Meridian Street, Indianapolis, has authorized a vocational training department in new two-story school at Brookside Parkway and Nineteenth Street, for which bids have been asked on general contract, estimated to cost $170,000. J. Edwin Kopf & Deery, Indiana Pythian Building, are architects.

Board of Trustees, Indiana State Normal School, Muncie, is considering extensions and improvements in power plant on campus, including installation of additional machinery, to cost about $55,000.

International Harvester Co., Bueter Road, Fort Wayne, will soon take bids for a one-story and basement sawtooth roof unit, 60 x 100 ft., to cost over $50,000 with equipment. Headquarters are at 606 South Michigan Avenue, Chicago. Company engineering department is in charge.

Board of School Trustees, Gary, is asking bids on general contract until June 24, for new three-story high school at Forty-sixth and Madison Streets, Glen Park, to include a vocational training department, estimated to cost $1,000,000. William B. Ittner, 911 Locust Street, St. Louis, is architect.

Perfect Circle Co., Hagerstown, Ind., manufacturer of piston rings, etc., is considering two new one-story additions to cost about $75,000 with equipment, portion of units to be used for storage and distributing service. John Teetor is president.

St. Louis

ST. LOUIS, June 9.—Superior Structural Steel Co., 5100 Farlin Avenue, St. Louis, has plans for a one-story addition, 70 x 140 ft., to cost close to $30,000 with equipment. William N. Brown is president.

R. F. Electrical Mfg. Co., Augusta, Kan., O. C. Jones, head, has awarded general contract to Cowen Brothers, 226 North Broadway, Shawnee, Okla., for one-story plant at Shawnee, to cost about $24,000 with equipment.

City Council, California, Mo., has plans nearing completion for a municipal electric light and power plant to cost about $50,000 with equipment. Alexander Engineering Co., Springfield, Mo., is engineer.

Board of Public Service, City Hall, St. Louis, is asking bids on general contract until June 24, for a new hangar at municipal airport, as per plans on file.

Kansas City Oxygen Co., 2012 Grand Avenue, Kansas City, Mo., manufacturer of commercial oxygen, etc., is completing plans for one-story plant at Madison Avenue and Woodswether Road, with foundations to provide for an additional story at later date, to cost close to $50,000 with equipment. Charles A. Smith, Finance Building, is architect. John R. Foran is president.

Warson Petroleum Co., Paul Brown Building, St. Louis, has awarded general contract to Austin Co., Arcade Building, for two-story oil storage and distributing plant at 1301 Macklind Avenue, 100 x 225 ft., with facilities for handling 5,000,000 gal. at one time, estimated to cost $250,000 with machinery. R. G. Pearson is president.

Central Power Co., Grand Island, Neb., has awarded general contract to Geer Co., 317 North Kimball Street, for two-story steam-operated electric power plant on Platte River, to cost about $65,000 with equipment. A. D. Baker, Clinic Building, is architect.

Kansas Gas & Electric Co., Sedgwick Building, Wichita, Kan., has plans for a three-story equipment storage and distributing plant, 150 x 154 ft., with electrical and mechanical repair department, and one-story automobile service and repair building, 75 x 275 ft., adjoining, to cost over $300,000 with equipment. C. V. Waddington is company architect.

Board of Education, Altus, Okla., is considering installation of manual training equipment in proposed new two-story high school to cost $160,000, for which plans are being drawn by Tomini & Bramblett, 416 West Main Street, Oklahoma City, Okla., architects.

Dillman Egg Case Co., Caruthersville, Mo., manufacturer of corrugated containers, etc., is planning rebuilding of portion of plant recently destroyed by fire with loss close to $50,000 including equipment.

Pacific Coast

SAN FRANCISCO, June 5.—Oliver United Filters, Inc., Fourth and Madison Streets, Oakland, Cal., manufacturer of filters for mining and mechanical service, parts, etc., has asked bids on general contract for new plant at Fruitvale, Cal., comprising several one-story units, to cost about $450,000 with equipment. Reed & Corlett, Oakland Bank of Savings Building, Oakland, are architects.

Pomona Pump Co., Pomona, Cal., has awarded general contract to C. T. Stover, 459 West Eleventh Street, Claremont, Cal., for initial units for proposed plant on 4-acre tract at Gibbs, Commercial and Monterey Streets, comprising one-story machine shop, 140 x 175 ft., and another one-story unit 40 x 70 ft., to cost about $40,000 with equipment. At later date, company plans three-story administration and engineering unit to cost over $50,000.

Pacific Bone, Coal & Fertilizer Co., Financial Center Building, San Francisco, has awarded a general contract to Barrett & Hilp, 918 Harrison Street, for two and six-story fertilizer manufacturing plant at South San Francisco, to cost about $125,000 with machinery. Ellison & Russell, Pacific Building, are engineers.

Bell Brothers, Inc., Mills Building, San Francisco, has awarded general contract to Cahill Brothers, 206 Sansome Street, for a two-story ice and refrigerating plant at Twelfth and Bernice Streets, to cost about $50,000 with machinery. E. H. Denke, 1317 Hyde Street, is architect.

American Smelting & Refining Co., McCormick Building, Salt Lake City, Utah, is planning installation of additional equipment at its Frisco Lulu Mine near Beaver, Utah, including electric hoist, air compressor and other machinery. A. H. Means is local manager.

Western Borax Co., Daggett, Cal., has awarded a contract to the Consolidated Steel Corporation, 1200 North Main Street, Los Angeles, for two one-story additions, 75 x 110 ft., and 75 x 120 ft., to cost over $70,000 with equipment.

Mountain States Power Co., Tacoma, Wash., is planning extensions and improvements in hydroelectric power properties and transmission system in vicinity of Big Fork and Kalispell, Mont., to cost over $200,000 with equipment.

Fidalgo Lumber & Box Co., Anacortes, Wash., plans rebuilding of portion of wooden box and lumber plant, recently destroyed by fire with loss reported in excess of $100,000 with equipment.

Northwest Washing Machine Co., Twenty-seventh Avenue, West, and Commodore Way, Seattle, has awarded general contract to Emil Nelson, 4407 Second Avenue, N. W., for one-story plant, 80 x 200 ft., at Eleventh Avenue and West Fifty-fifth Street, to cost about $50,000 with equipment. Bain & Pries, Liggett Building, are architects.

Common Council, Springville, Utah, will soon begin work on addition to municipal hydroelectric power plant with installation of water wheel, generator and auxiliary equipment, for which plans have been completed.

Marsh Reiman, Los Angeles, care of William J. Moran, 324 West Forty-eighth Street, architect, has plans for a one

and two-story machine shop, 50 x 150 ft., at 757 East Washington Street, to cost close to $40,000 including equipment.

Canada

TORONTO, June 9.—The Canadian Wirebound Boxes, Ltd., Gerrard Street East, Toronto, Ont., has announced that plans are in progress for a factory in Toronto.

F. E. Woodward & Sons, Ltd., Seventeenth Avenue, Lachine, Que., will build a two-story plant addition. Hutchinson & Wood, 204 Notre Dame Street West, Montreal, are architects.

Robertson Lead Mfg. Co., Ltd., 6744 Hutchison Street, Montreal, has purchased property on Notre Dame Street for a manufacturing plant.

Canadian Industries, Ltd., Beaver Hall Hill, Montreal, have awarded contract for the erection of a fertilizer plant at Beloeil, Que., to Anglin Norcross, Ltd., 2063 Victoria Street, Montreal. Buildings will cost approximately $225,000, and equipment a like amount. MacKinnon Steel Corporation, Ltd., Sherbrooke, has been awarded steel contract.

Barry's & Stains Linoleum (Canada), Ltd., has awarded general contract to Church, Ross Co., Ltd., 1440 St. Catharine Street West, Montreal, for its $2,000,000 linoleum manufacturing plant at Farnham, Que. J. M. Robertson, same address, is consulting engineer.

Board of Control, Toronto, Bert S. Wemp, chairman, will receive bids until July 29 for the supply and installation of two 24,000,000-imperial gal. centrifugal pumps and two 10,000,000-gal. centrifugal pumps with induction motors and control equipment at the high level pumping station, Toronto.

Western Steel Products, Ltd., has made a public offering of $1,000,000 issue of 6 per cent first mortgage sinking fund gold bonds, the proceeds to be used for the purchase of the plant and business of George W. Read & Co., Ltd., Montreal, and for expenditure on plant additions, including the cost of a new plant in Montreal, to be completed about Nov. 1.

The Peterson & Cowan Elevator Co., Ltd., 333 Cambie Street, Vancouver, B. C., has awarded contract to Dominion Construction Co., Ltd., 509 Richards Street, for a plant. Fred T. Jamieson is vice-president of the company.

Border Canning Co., New Westminster, B. C., is completing arrangements for the manufacture of its own cans. The plant is being enlarged and the necessary machinery will be installed without delay.

Woodwards, Ltd., Vancouver, B. C., has awarded general contract to Dominion Construction Co., 509 Richards Street, for a five-story garage, to cost $200,000.

Department of Railways and Canals, Federal Government, has awarded contract to Carter-Halls-Aldinger Co., Ltd., Royal Bank Building, Winnipeg, for a 2,000,000-bu. elevator at Churchill, Man., to cost $1,200,000. C. D. Howe & Co., Whalen Building, Port Arthur, Ont., are engineers.

Canadian Foundry Supplies & Equipment, Ltd., 185 Wellington Street, Montreal, has awarded contract to Church, Ross Co., Ltd., for a manufacturing plant, office building and garage at St. Henri, to cost $110,000. T. Pringle & Son, Ltd., 410 St. Nicholas Street, is engineer.

Foreign

NEGOTIATIONS are under way by Huasteca Petroleum Co., 122 East Forty-second Street, New York, a subsidiary of Pan-American Petroleum & Transport Co., with Mexican Government for concessions in oil fields in northern Tampico district. Company plans fund of $10,000,000 for development in that territory, including pipe line construction, storage and distributing facilities, etc. L. L. Anderson is general manager.

Compagnie Standard Franco-Americaine, Paris, France, an interest of Standard Oil Co. of New Jersey, 26 Broadway, New York, is arranging increase in capital from 60,000,000 to 200,000,000 francs, additional fund approximating $6,700,000, United States currency, to be used for expansion and improvement in properties in France, including increased production and distributing facilities.

Government of Latvia, Riga, is planning for extensions and improvements in harbor at Memel, including new quays 748 meters long, installation of traveling cranes and other mechanical-handling equipment, entire project estimated to cost about $900,000.

Empresas Electricas Mexicanas, Ltd., has been formed under Delaware laws by officials of American & Foreign Power Co., operated by Electric Bond & Share Co., 2 Rector Street, New York, to take over and operate Compañía Nacional de Electricidad, S. A., of Mexico, with steam-operated electric generating plant at Torreon, Mexico, and other properties in that district. New company will carry out expansion program in future, including transmission line construction.

Kokswerke A. G., Berlin, Germany, will build a new plant for production of sulphuric acid, adjoining large coke plant at Gleiwitz, in western part of Upper Silesia. New plant will use Swedish iron pyrites as source of raw material, and will utilize majority of output of new acid plant for manufacture of ammonia fertilizers. Plant will represent investment of more than $400,000 and is expected to be ready for service in fall.

Government of Portugal, Lisbon, has disposed of an internal loan of 100,000,000 escudus (about $4,510,000), fund to be used for port improvements and extensions, including installation of cranes, conveyors and other mechanical-handling equipment at different points.

Jamaica Public Service Co., Kingston, Jamaica, W. I., has arranged for purchase of St. James Utilities, operating an electric light and power plant, and ice-manufacturing plant at Montego Bay, at opposite end of island, and plans expansion, including transmission lines. Negotiations are under way for purchase of other properties.

Following recent purchase of substantial interest in Metal Box & Printing Industries, Ltd., London, England, by Continental Can Co., 1 Pershing Square, New York, work has begun on expansion at Metal Box company plant, to include installation of automatic machinery for production of tin food cans, with auxiliary equipment for mechanical-handling, distributing, etc. Entire program will cost over $1,000,000.

New Trade Publications

Heat-Treating Furnaces.—Hevi Duty Electric Co., Milwaukee. A new bulletin, No. 530, describes and illustrates the new electric rotary retort furnace for pressure carburizing.

Cleaning Castings.—Pangborn Corporation, Hagerstown, Md. An illustrated four-page leaflet describes the new dustless core knockout which is claimed to thoroughly remove cores, core rods and other material from all parts of a casting by hydraulic cleaning under high pressure.

Aluminum Alloy Castings. — British Aluminium Co., Ltd., New York; 24-page pamphlet describing foundry practice and the requirements for compositions standardized by Society of Automotive Engineers, British Engineering Standards Association, and for British and American naval aircraft.

Portable Hardness Tester — Industrial Apparatus & Instrument Co., Newark, N. J. Folder describing device for making Brinell tests. It is shaped like a C-clamp, with the ball on one grip. Pressure is measured by a dial actuated by elastic change in the body of the clamp.

Metal Plating.—Engineering Devices Co., 545 Fifth Avenue, New York; 200-page book describing inventions of Prof. M. Schlötter in the field of metal coating with a variety of metals, primarily by the control of special electrolytic solutions.

Cyanide Hardening Furnace.—Hyro Mfg. Co., 200 Varick Street, New York; eight-page folder describing a hooded and protected cyanide pot and quenching tank, containing mechanism whereby a tray loaded with metal parts may be transferred from pot to quench without splashing operator.

Rare Metals.—Fansteel Products Co., North Chicago, Ill.; 56-page booklet describing metallurgical processes used in the production of pure tantalum, tungsten and molybdenum, and their utility in the electrical, radio, chemical and automotive industries, and in the arts.

High-Grade Forgings. — Heppenstall Co., Pittsburgh; 24-page pamphlet containing many photographs of forging operations and shafting, disks, rings, sleeves, rams and dies made of forged, heat-treated and machined alloy steel.

Equipment for Sorting Steel.—Adam Hilger, Ltd., London, N. W. 1, England; eight-page pamphlet describing "Steeloscopes"—portable spectroscopes suitable for observing spark spectrum of steels and thus determining instantly the type of alloy contained.

Hollow Drill Steel.—Fred Baker, Inc., 154 Nassau Street, New York; sheet describing the properties of "Phoenix-MK" rock drill steel where the central hole is formed over a metal core and is smooth, concentric, uniform in size and free from oxide.

Unit Heater.—Buffalo Forge Co., Buffalo, N. Y. Two-page circular, illustrating and describing the new Buffalo 16-in. twin Breezo-Fin unit heater, which is said to have the lowest B.t.u. cost of this company's entire line of unit heaters. Tables of rating and dimensions are given.